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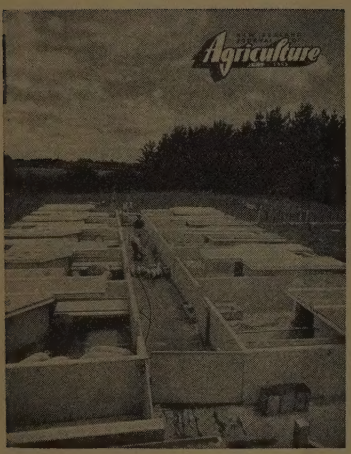

Massey Agricultural College research piggery, which is an important link in the production of higher-performance pigs for New Zealand farmers, is the subject of this month's cover, which is from a photograph by R. V. Francis Smith. The Minister of Agriculture, Mr C. F. Skinner, in this issue draws attention to efforts being made by the New Zealand Pig Producers' Council to stimulate pig production and the need, because of falling dairy prices, for farmers to pay more attention to pigs. Steps that can be taken immediately to get better returns from pigs are outlined in the article which begins overleaf.

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FATTENING MORE PIGS

Can Help Bridge Dairy Income Gap

THE present condition of the overseas butter market indicates that it would be wise for dairy farmers to carry out some diversification of production. One of the obvious things to examine is whether efficient use is being made of the by-product of the farm or factory. The present potential for pig production and the scope for expansion are reviewed in this article by A. Longwill, Superintendent, Pig Industry, Department of Agriculture, Wellington.

A REVIEW of the scope for pig production in New Zealand covering trends from the early 1930s to 1951 was published in the "Journal" in March 1952. This showed that though toward the end of this period the total amount of dairy by-products produced was at record level, increasing amounts processed for milk powders, casein, sugar of milk, etc., reduced the quantity available for pig feed to about 9 per cent below that available in the period 1933-38. In spite of this the available dairy by-products were sufficient to produce more than a million pigs each year, almost double the production then being achieved.

Statistics which accompany this article show that since that last review total dairy production has increased further, but so has the processing of by-products, and now almost one-third of them is used for purposes other than pig feeding. The total amount used by pigs has dropped to 20 per cent below the pre-war level. Despite this there is still ample food to produce a very substantial increase in pig meats.

Trends in pig production and the efficiency with which the dairy by-products have been used for this purpose over the last 20 years will be examined first in this article.

Increased production must start with more sows, but these must be adequately fed throughout the year. These breeding sows at the Department of Agriculture's Ruakura Animal Research Station are being grazed on rationed autumn-saved pasture to assist them to maintain good health and condition.

Cow and Sow Populations

Table 1 gives the statistical picture of pig production in relation to the national dairy herd. It shows that cow population declined by about 160,000 in the 10 years from the peak reached at the end of the depression of the 1930s. It was some years after the war before the number of cows in milk began to build up once more. The sow population followed a similar but more accentuated pattern, the extremes in variation being reached a year or two after those in cow population.

The sow : cow ratio, which is important in planning efficient use of dairy by-products, widened from 1 : 16 at the end of the depression to 1 : 26 in 1949, when the trend was reversed. It recovered to 1 : 22 by 1955, but again slipped back to 1 : 24 by 1957.

Dairy By-products and their Use

Table 2 gives details of the use of all dairy by-products and the quanti-

National Hybrid sows of proven superior productive capacity are bred to assist commercial producers whose management and facilities are already of a high standard to reach top production efficiency.

TABLE I—PIG MEAT PRODUCTION IN THE LAST 25 YEARS*

	Sows over 1 year old	Dairy cows in milk	Ratio of sows to cows in milk	Pigs slaughtered	Estimated gross pig meat production	Meat produced per sow	Food units per lb. of meat (dairy by-products available for pigs)
					tons	cwt.	
1933 ..	87,686	1,733,913	1 : 20	678,068	29,640	6.8	9.4
1934 ..	98,299	1,816,402	1 : 18	823,467	35,500	7.2	8.6
1935 ..	111,793	1,827,962	1 : 16	955,579	40,870	7.3	7.2
1936 ..	116,058	1,823,358	1 : 16	1,097,306	46,860	8.1	6.6
1937 ..	112,921	1,805,405	1 : 16	1,122,204	47,560	8.4	6.8
1938 ..	104,803	1,763,775	1 : 17	1,091,789	47,900	9.1	6.3
1939 ..	96,754	1,744,478	1 : 18	962,657	42,580	8.8	6.4
1940 ..	92,759	1,739,874	1 : 19	872,091	49,440	10.6	5.9
1941 ..	100,378	1,779,603	1 : 18	1,004,689	52,620	10.5	6.0
1942 ..	91,338	1,777,239	1 : 19	926,042	47,980	10.5	5.7
1943 ..	82,023	1,714,959	1 : 21	766,850	44,320	10.8	6.1
1944 ..	77,281	1,647,920	1 : 21	726,595	43,250	11.2	6.6
1945 ..	77,202	1,678,943	1 : 22	675,210	42,380	11.0	6.8
1946 ..	72,573	1,661,944	1 : 23	655,529	38,440	10.6	6.6
1947 ..	67,938	1,657,690	1 : 24	633,334	39,490	11.6	6.8
1948 ..	68,354	1,713,532	1 : 25	637,715	38,350	11.2	7.1
1949 ..	68,305	1,746,735	1 : 26	674,304	40,200	11.7	7.2
1950 ..	74,509	1,850,089	1 : 25	677,194	39,900	10.7	7.5
1951 ..	75,053	1,898,197	1 : 25	706,820	40,000	10.7	7.7
1952 ..	77,747	1,905,534	1 : 25	685,132	39,900	10.3	7.5
1953 ..	81,162	1,962,492	1 : 24	740,439	42,250	10.4	7.4
1954 ..	87,104	1,999,140	1 : 23	759,862	38,650	9.0	7.2
1955 ..	88,969	1,994,761	1 : 22	777,675	39,800	9.0	7.2
1956 ..	85,463	1,992,000	1 : 23	815,893	41,400	9.7	7.0
1957 ..	†83,400	†1,990,000	1 : 24	748,426	40,500	9.7	6.6

* Years ending 30 September. † Provisional.

ties available for pig feeding. When it is realised that one-third of all the by-products is now not available for pigs, the widening of the sow : cow ratio is not as serious as may appear on the surface.

There has also been a change in the proportion available for pig food of the various by-products. Skim milk has declined from 75 per cent to 70 per cent of the total food units represented by dairy by-products, but whey has increased (as casein whey) from 21 per cent to 26 per cent. Buttermilk is virtually unavailable for pigs and vilac (mother liquor from sugar of milk manufacture) is now largely used for other stock after processing with molasses.

Standards of Efficiency of Utilisation

Standards for supplementing the basic dairy by-products and for conversion of the total food units thus calculated to pig meat (based on the performance in practice of some of the more efficient producers) were set out in detail in the review published in 1952. The same standards are used in this analysis:

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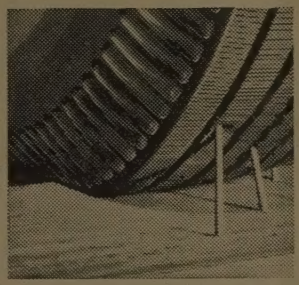

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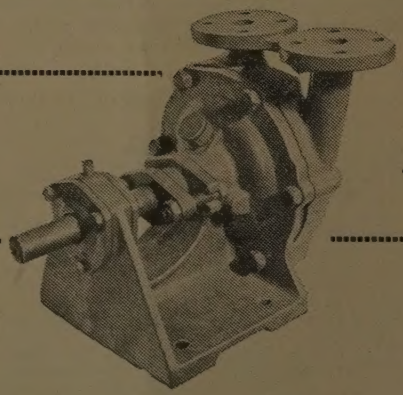

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TABLE 2—DAIRY BY-PRODUCTS AND THEIR DISPOSAL

	Average of 5 years 1933-34 to 1937-38	1943-44	1950-51	1956-57
		lb. (millions)		
Skim milk				
From butter (factory and farm)	6,472	5,307	6,610	7,071
From cream for human consumption	53	71	85	92
Total available	6,525	5,378	6,695	7,163
Use:				
Skim milk and blended powders	120	183	596	1,134
Calves	300	306	400	423
Casein	300	80	564	1,239
Fowls, sundry (est.)	10	12	12	12
	730	581	1,572	2,808
For pig feed	5,795	4,797	5,123	4,355
Whey				
From cheese	1,673	1,676	1,945	1,648
From casein	302	76	536	1,177
Total available	1,975	1,752	2,481	2,825
Use:				
Sugar of milk	—	81	234	318
Calves	79	71	71	75
	79	152	305	393
For pig feed	1,896	1,600	2,176	2,432
Buttermilk				
From factory, farm, and whey butter	431	357	468	445
Use:				
Buttermilk and blended powders	—	4	218	415
For pig feed	431	353	250	30
Concentrated vilac				
(Mother liquor from sugar of milk)	—	4	12	15
Use:				
Other stock	—	1	8	12.25
Feed for pigs	—	3	4	2.75

Food supply: 80 per cent dairy by-products, 5 per cent bought meals, and 15 per cent grazing and home-grown crops.

Conversion: 5 food units required to produce 1 lb. of pig meat. Figures are also shown (Table 3) for lower efficiencies—6 and 8 food units per pound of pig meat.

Any consideration of standards of efficiency must take into account the practical economic climate in which the industry is working. Denmark, for instance, with a dairy industry of similar size to New Zealand's, rations out milk with extreme care, using cereal meals as 80 per cent of the total feed, and produces six times as many pigs as New Zealand does.

The main reasons this is possible are: (a) Cereals are cheap relative to the net return for pig meat; (b) labour organisation on Danish farms enables pigs to be fitted in as a very efficient link in the chain of production; (c) over the years progressively increasing efficiency in breeding, feeding, housing, and general management has reduced unit cost of production below that of other countries where the surplus production is marketed.

▼ Having feed in a creep constantly available to suckers is fundamental to efficient growth and food conversion of pigs at later stages.

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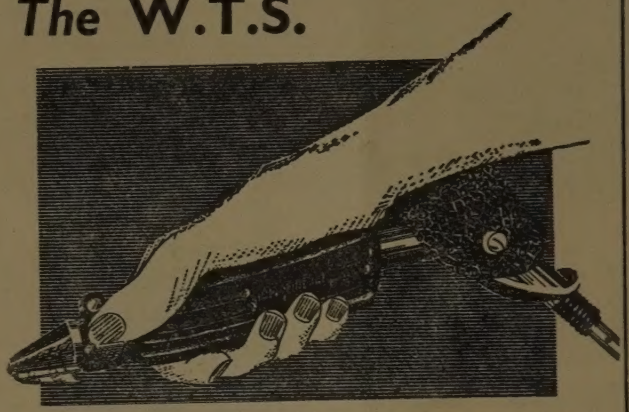

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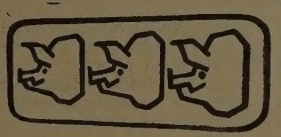
The position in New Zealand is very different and costs of production are kept down chiefly by virtue of the use of a virtually costless by-product as the main feed. Hence, any practical standards used for setting targets in the immediate future must be based on a food supply 80 per cent of which consists of dairy by-products.

Scope for Increased Production

On the standards already mentioned the available food has not been used nearly as efficiently as it should have been. The potential levels of pig meat production at different efficiency levels set out in Table 3 are for various periods over the last 20 years. If the standard of 5 food units to produce 1 lb. of pig meat is accepted, pig production has been at little more than half cock over this period. The highest level of efficiency was reached during the war, when labour was scarcest, but there was a feeling of real urgency to produce pig meat which contributed so importantly to the rations of servicemen in the Pacific.

MAY is national pig month



If producers are resolved to make full and efficient use of the foods available, 70,000 tons of pig meats (1,000,000 porkers and 500,000 baconers) is not an impracticable target. The achievement of this high standard, however, will demand the strenuous and unremitting application of producers collectively in organising breed improvement and planning production and marketing to best advantage and individually in applying the best feeding and management methods.

How to Increase Production

The first "leakages" which must be stopped are the obvious ones where dairy by-products are at present being allowed to go straight to waste. This applies chiefly to whey from cheese and casein factories. Directors of these companies have a responsibility to see that the by-product is used productively.

Security of food supply is fundamental in financing construction of a piggery. If a dairy company is not prepared to run its own piggery, it should make it possible for one or more suppliers or other contractor to develop a sound pig enterprise by granting a constant supply of whey for at least 10 years. Individual arrangements between dairy factory suppliers who, on the one hand, do not wish to make use of their dairy by-product, and those, on the other hand, who are prepared to collect and make use of it can do much to remove the waste of both skim milk and whey that is still taking place.

Collective action on breed improvement is being taken by producers through their organisations, the New Zealand Pig Producers' Council and the New Zealand Pig Breeders' Association, but both of these should be more strongly supported by breeders in making use of the Pedigree Pig Improvement Scheme and by the commercial producer demanding, and being prepared to pay for, stock with the desired performance breeding.

Individual Efforts

If determined to make pigs pay through efficient production methods, the individual dairy farmer can take action, giving precedence in logical order, somewhat as follows:

1 Have a clear concept of the variations in food supply and the number of pigs necessary to make effective use of all the dairy by-product in the flush months.

TABLE 3—TOTAL FOOD AVAILABLE FOR PIGS (WITH PERCENTAGE FROM EACH CLASS)

	1933-34/ 1937-38	1943-44	1950-51	1956-57
		Food units	(thousands)	
Dairy by-products:				
Skim milk	579,500	479,700	512,300	435,500
Whey	126,400	106,667	145,067	162,133
Buttermilk	43,100	35,300	25,000	3,000
Vilac	—	1,500	2,000	1,367
Total dairy by-products	749,000	623,167	684,367	602,000
	(77 per cent)	(76 per cent)	(79 per cent)	(77 per cent)
Meals, etc.:				
Barley	15,000	10,000	20,000	14,000
Meat meal	20,000	20,000	18,000	20,000
Peas	750	1,500	2,000	1,500
Maize	1,000	750	1,000	1,000
Copra, etc.	250	1,000	1,000	1,000
Molasses	8,000	4,000	5,000	5,500
Tallow	—	1,000	500	1,000
Pollard and bran	20,000	—	—	1,000
Total meals, etc.	65,000	38,250	47,500	45,000
	(7 per cent)	(5 per cent)	(5 per cent)	(6 per cent)
Roots, fodder crops, grass:				
Sugar/Fodder beet	—	2,250	2,000	2,000
Carrots	7,500	3,500	2,400	2,500
Potatoes (pig)	6,000	5,000	3,500	2,500
Artichokes	750	750	800	500
Mangels	6,000	3,000	2,000	1,000
Swedes	28,000	27,000	20,000	10,000
Pumpkins, etc.	2,000	2,500	2,000	1,000
Chou moellier	250	1,000	1,000	500
Grass	100,000	100,000	100,000	100,000
Total crops and grass	150,500	145,000	133,700	120,000
	(15 per cent)	(17 per cent)	(15 per cent)	(15 per cent)
Total for dairy-fed pigs	964,500	806,417	865,567	767,000
Garbage and offal (estimate)	10,500	18,500	17,000	19,000
	(1 per cent)	(2 per cent)	(2 per cent)	(2 per cent)
Total food (all sources)	975,000	824,917	882,567	786,000
Potential Pig Meat Production				
Conversion rate (food units per lb. pig meat)	tons	tons	tons	tons
8	54,380	46,040	49,275	43,863
6	72,510	61,380	65,700	58,483
5	87,010	73,660	78,840	70,180
Actual Pig Meat Production				
	45,730	43,250	39,080	40,490
Efficiency on 5 food units per 1 lb. pig meat standard	53 per cent	59 per cent	51 per cent	58 per cent

[2] With the best quality and most productive stock available set about breeding enough pigs to cope with the food available in the flush. This means with skim milk maintaining a ratio of 1 sow to 10 cows and with whey 1 sow to 15 cows. Pigs must be bred at the right time of year (May-June) and out-of-season feed provided for the breeding stock and suckers so that they are never underfed. Supplementary feed should be available also for finishing porkers in autumn at good market weights rather than carrying large stores over winter or sacrificing them as stores or underweight porkers in autumn.

[3] Every aspect of sow management must be geared to obtain the full productive capacity of the sow. Well grown but lean-fleshed gilts of about 250 lb. liveweight at 8 months selected from high-producing stock of good type should be mated at this stage to farrow at 12 months of age. It is preferable for the first litter to be farrowed in May or November, as once the breeding cycle is established rearrangement of farrowing times is difficult.

The aim in feeding should be to maintain good, healthy flesh and to avoid overfattening. For sows run on good grass light skim milk or whey feeding will be adequate, though during the last 6 weeks or so of pregnancy sows fed on whey should preferably have ½ lb. to 1 lb. of meat meal added to their daily ration, as the rapidly growing unborn litter requires the nutriment derived from a protein-rich ration.

The productive sow will lose 80 lb. to 100 lb. liveweight during the 8 weeks she suckles her litter. It is vitally important that immediately she has dried off she should be fed 6 gallons of skim milk or its equivalent daily to achieve a rapid improvement in condition for remating and for the first month or so of pregnancy. Failure to pay attention to this point can result in the sow remaining empty and unprofitable for a considerable period.

[4] If food provision has been planned correctly, attention can next be given to its most effective use. Judicious use of bulky farm-produced crops with the correct amount of purchased concentrate to achieve the feeding result required will enable purchased foods to be used economically. Having carefully chosen creep feeds constantly in front of the suckers from the time they are a fortnight or so old, provided this is fed cleanly and without waste, is fundamental to efficient pig production.

Rationing feed to pigs beyond the porker stage so that the daily intake gives the optimum growth of lean meat without wasteful overfattening becomes practical when adequate numbers of pigs are on hand and when enough accommodation to house all pigs in litter groups or groups of similar size has been provided.

[5] This leads on to the provision of efficient housing. Here two aspects are important. The layout arrangement to minimise labour and the efficiency of the housing units themselves in facilitating efficient food conversion and ensuring healthy conditions generally.

[6] Farmers who have given attention to all the above management factors will find scope for still further improvement in selection of stock of superior productive quality for which the search must go on continuously through national pig improvement schemes and such other refinements of management as early weaning of litters to improve sow use and efficiency of food conversion, as well as fitting pigs better to the feed supply. Finally, careful balancing and rationing of food to secure the best results in terms of carcass quality, conversion, and over-all profit will provide interesting activity for the efficient producer.

How much will your butterfat cheque be down next season?

How many more pigs must you produce to bridge that gap?

Set about rearing the maximum possible from spring litters.

(Statistics prepared by statistics section, Extension Division, Department of Agriculture.)

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during February 1958 and for the 7 months ended 28 February 1958 with comparative figures for the same month and the 7 months of 1956-57 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage inc. or dec.
February 1958	14,560	299	14,859	—
February 1957	13,033	298	13,331	—
Increase	+1,527	+1	+1,528	+11.462
7 months ended 28/2/58	141,936	2,251	144,187	—
7 months ended 28/2/57	130,015	2,261	132,276	—
Increase or decrease	+11,921	—10	+11,911	+9.004

Butter in store at 28 February 1958 was 27,929 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage inc. or dec.
February 1958	7,740	1,437	9,177	—
February 1957	8,909	944	9,853	—
Increase or decrease	—1,169	+493	—676	—6.860
7 months ended 28/2/58	59,686	10,297	69,983	—
7 months ended 28/2/57	61,036	8,398	69,434	—
Increase or decrease	—1,350	+1,899	+549	+0.790

Cheese in store at 28 February 1958 was 23,244 tons

If these figures are converted into butterfat equivalent, there is an increase of 7.433 per cent in butterfat graded for the 7 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place they are not necessarily a true indication of production trends.

Construction of Cattle Yards, Bails, and Loading Ramps

Beef cattle are essential for control of pastures and rough areas on many New Zealand farms, but often handling of them is made more difficult than it need be because yards are inadequate or badly designed. Planning and construction of cattle yards are discussed and illustrated profusely in Department of Agriculture Bulletin No. 380, "Cattle Yards". Copies may be obtained free from offices of the Department.

In discussing the various points of yard design and construction the bulletin recommends the use of materials that will give a durable job yet help to keep costs within bounds. There are extensive sections on gates, gate fasteners, cattle and calf bails, and loading ramps.

Winter Show Dates

14, 15, 16, and 17 May—Whakatane A. and P. at Whakatane.

*27, 28, 29, 30, 31 May, 2 and 3 June—Waikato Winter Show at Hamilton.

*29, 30, and 31 May, 2 and 3 June—Otago A. and P. at Dunedin.

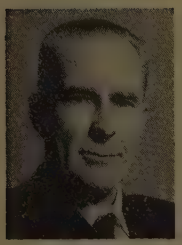
*11, 12, 13, and 14 June—Taranaki A. and P. at New Plymouth.

12, 13, and 14 June—Te Kuiti and District Winter Show at Te Kuiti.

24, 25, 26, 27, and 28 June—Whangarei A. and P. Winter Exhibition at Whangarei.

* The Department of Agriculture exhibit will be staged at this show.

Untapped Profits from Pigs



PIG raising in New Zealand has never been developed as it might be. Our present dairy prices position again sharpens the focus on how much pigs might contribute to bolstering the incomes of dairy farmers, especially when, as now, the value of butterfat has fallen sharply. We face a situation when dairy farmers may have to depend quite substantially on pigs to bridge the disparity between incomes from the comparatively lush years and what they can expect in the future.

That there is a good deal of scope for making more money out of pigs is plain; that it will be wise for us to broaden the field of our dairy farm production generally by stepping up pig meat sales is just as evident. It can be done—from available food supplies and to a large extent with existing labour and little if any capital outlay in the first phase.

A large proportion of the dairy by-products available is not being fed efficiently and, regrettably, a further substantial amount is simply being allowed to go to waste.

I am very pleased that the New Zealand Pig Producers' Council has taken the initiative in a campaign to encourage farmers to take a livelier interest in pigs. Meetings have been arranged for various centres during May and I trust these will receive good support.

Attitude toward Pigs

It cannot be denied that there is a good deal of aversion among some farmers to pigs and a tendency to dispense with them if possible in prosperous times or at least to give them rather shabby treatment. Such neglect seems to have sprung from the old belief that pigs can get along in almost any makeshift conditions and be subjected to neglect which farmers would never impose on their milking herds.

The explanation may be that whereas with the dairy herd there is a day-to-day accounting of returns in milk and cream, on most pig establishments precise performance is much less tangible. It need not be, as performance recording could be adopted by any farmer sufficiently interested. If we want to get the best from our pigs, we will have to come round to it. After all, it was not until performance tests (herd testing) were developed for dairy cattle that farmers really had a reliable guide for building up efficient herds. Some of the older farmers may recall the surprises they got when for the first time they got the figures showing the individual merit of cows in their herds.

However, as I see it the first thing to be done about pig production is to make the fullest use of the dairy by-products now not all consumed. In this country we have the advantage of virtually costless milk by-products in great quantities available for pig feeding. Such feed is much prized and carefully rationed to pigs in other countries, such as Denmark.

Despite the rise since the war in the amount of milk powders, sugar of milk, and similar products manufactured there is ample milk feed to provide the main diet of over 1,000,000 pigs a year. I know that farmers are not in a position to make any radical changes in buildings and stock for the coming season, but they can do their utmost to ensure that sows farrow under reasonably good conditions, that there is as high a survival rate among litters as possible, and that piglets get a good start so that as many pigs as possible are on hand to take full advantage of the flush of skim milk or whey.

Later, farmers who wish to expand or improve their production will be able to make use of the information they gather at the special meetings I have already mentioned or from district pig council or Department of Agriculture officers. It is fortunate that despite a fairly general apathy toward pigs the enthusiasts in the industry have seen that research and other measures for improving the standard of pigs have been maintained. As a result advisory officers are well equipped with information which many farmers will now want to get.

Greater Efficiency in Production

Mechanical aids and better techniques have been used freely by farmers in recent years to achieve much higher production from sheep and dairy stock without significant increases in labour needed. Results can be achieved in the same way with pigs if available knowledge and that which enthusiasm would undoubtedly generate were generally applied.

Though the primary step in greater production from pigs will be full use of dairy by-products, we must also think in terms of more efficient conversion into pig meat of the materials fed. Present efficiency on the basis of conversion of food to meat has been assessed by Department of Agriculture experts at not much more than 50 per cent. We must get away from that haphazard pumping of too liberal amounts of skim milk into pigs during the flush and thin rations for those held over. This entails breeding pigs at a time to fit the fluctuating food supply and providing good quality grass and, where practicable, crops for winter.

Another step in better pig production will be careful selection of stock with the ability to produce big litters capable of converting feed economically into good carcasses. Very good work has already been done in developing the National Hybrid Sow at the Ruakura Animal Research Station and in testing its capabilities at Massey Agricultural College. Now the New Zealand Pig Producers' Council has its own fine breeding centre near Te Awamutu and I am hopeful that some day we can proceed to the next natural step of a full-scale testing station.

Capturing Interest of Young Farmers

I can think of no better way of achieving higher production than by capturing the interest and support of the rising generation of dairy farmers. I recall a suggestion made in the "Journal" some years ago that farmers on dairy holdings not suitable for subdivision might consider handing over the pig side to a son who might otherwise find insufficient inducement to remain on the property. This strikes me as a particularly sound idea. Even on a small farm the pig business could be built up for a keen youngster by obtaining extra feed from a factory not processing it or by getting skim milk from neighbouring farmers who from choice or circumstances were not keeping sufficient pigs to cope with all they had.

Earlier I stressed the need for diversification in production on dairy farms. Pork and bacon are commodities which can most readily be increased. In their own and the national interest farmers should give the fullest support to efforts now being made to assist them to produce more and better pigs.

—C. F. SKINNER, Minister of Agriculture

Invermay's First Farmers' Conference

THE opportunity to attend in their own district a farmers' conference of the type which has become so popular at the Ruakura Animal Research Station and at the two agricultural colleges was given to Otago and Southland farmers recently when the Department of Agriculture's Invermay Research Station held its first farmers' conference. The response of local farmers was encouraging, so much so that the staff of the Station hope that such a conference can be arranged in future as a yearly event. About 200 farmers attended the first day's proceedings in Mosgiel, when papers by officers of the Station staff and others were presented, and a larger number of visitors inspected the Station and heard talks from the staff on the second and final day.

INVERMAY Research Station was established in 1949 in North Taieri, about 8 miles from Dunedin, to investigate problems of concern to farmers in Otago and Southland. It has an area of 1,300 acres, on which there are three distinct classes of land—fertile, flat alluvial land, second-class undulating downland, and third-class, marginal, scrub land. Trials are conducted on all three types of land with crops, fertilisers, minor elements, weedkillers, pastures, livestock, subsoiling, and drainage.

Results obtained in these trials and recommendations which could be made from findings in the Station's experimental work formed the bulk of the advice and information imparted to the visiting farmers.

HEADING PHOTOGRAPH: K. H. C. Lewis describing mating of hoggets trials at the field day at Invermay on the second day of the conference. The 4-tooth ewes being inspected by farmers had reared lambs as hoggets.

Comparison of Farming Scenes

A comparison between farming in 1922, when he was appointed as the Department of Agriculture's first Instructor in Agriculture for Otago and Southland, and that of today was made by the Director-General of Agriculture, Mr R. B. Tennent, in opening the conference.

In 1922, he said, the First World War had been over for about 4 years and its immediate effects were being overcome. There had been few physical shortages except perhaps superphosphate, and labour had been plentiful. Farmers had just experienced a disastrous fall in prices, first in meat and wool and then in butter and cheese. The outlook had been extremely depressing, especially for those men newly established on the land such as soldier settlers. They had been loaded with very heavy mortgage charges and still had been short of capital and they often had lacked experience as well.

The area occupied, about 43,000,000 acres, had been much the same as it was today, though the area of sown grasses was now about 10 per cent higher. Breeding ewe numbers had been between 12,000,000 and 13,000,000 and total sheep numbered 22,000,000, no higher than the figure in 1911. Dairy cows had numbered about 1,100,000 and had been increasing rapidly.

"In 1922 farmers had just harvested over 350,000 acres of wheat, the largest area since 1898-99 and the largest area this century. The area in oats was declining rapidly, though there had been only a small drop in the numbers of horses. The loss of Australian export markets for oats, fairly important to Otago and Southland farmers before 1914, was something of a blessing in disguise, as it undoubtedly induced farmers to devote more attention to the management of their pastures."

Mr Tennent went on to say that extension work and scientific research had hardly existed in 1922, but in the field of establishing better pastures and growing better crops the biggest advances had been made.

"If we look back and think of a typical paddock on the better-class country 30 to 40 years ago with its mixture of good, bad, and indifferent

grasses and then think of the pasture cover that many farmers have created today, we will realise just how much progress has been made," he said.

"Sheep numbers in 1957 were about 42,000,000 and the total of breeding ewes was about 29,000,000. Dairy cows now number about 2,000,000. Since 1922 the volume of farm production has increased almost threefold and the livestock carried have approximately doubled. The output per man engaged has practically doubled also and the improvement in productivity is still very rapid.

"How has all this been accomplished? The main reason is that we have been able to provide from the same area a much greater supply of more nutritious feed. Improved standards of management have also enabled farmers to use this feed more effectively."

Though Otago farmers in the 1920s and 1930s had not been able to use all the developments that had proved so effective in the dairy farming districts in the North Island, progress in recent years had been very rapid as the result of more liberal use of lime and fertilisers, regrassing of many paddocks containing second-rate pasture, correction of soil deficiencies, and more effective subdivision of properties. Perhaps the most notable increase had been in the number of fat lambs killed. In 1919-20 they had totalled 329,000 in Otago; in 1956-57 they had numbered 1,644,000.

"Today there is an atmosphere of pessimism because the prices for nearly all our major export products have fallen. When, however, one reviews the developments of the past 35 to 36 years it can readily be seen that New Zealand has faced equally difficult situations in the past and has pulled through and prospered.

"I am convinced that there is every reason to believe that this will happen again. Short-term difficulties there will be, but provided these are not too prolonged, the effects can be salutary."

Land Development in Otago

About 1,000,000 acres in Otago and Southland were waiting to be developed, said **H. A. Duff**, Fields Instructor, Department of Agriculture, Dunedin, in his paper **"Land Development in the Dunedin District"**, and 200,000 acres of second-class and third-class land in the Waipori, Lee Stream, Wehenga, and Hindon districts were within 20 miles of Mosgiel.

Cooperative work begun about 15 to 20 years ago by farmers and the Department to find how tussock country and reverted pasture in the area could be made to grow crops and high-producing pastures had started with the testing of various grass species, clovers, lucerne and chicory, and lime and phosphatic fertilisers. This had been followed by experiments with trace elements such as boron, zinc, vanadium, molybdenum, and magnesium and with casting worms, but the real turning point had been evidence which proved that the inoculation of clovers had been essential.

It had been established that with ample reverted superphosphate (3 cwt. per acre) plus molybdenum and clover inoculation extensive unploughable or unploughed areas could be made to grow clovers successfully.

Use of the roller drill had enabled grass seed mixtures normally sown at 38 to 42 lb. per acre to be reduced to 22 to 24 lb. per acre, and some farmers had saved the capital cost of the machine in the cost of seed in 1 year.

"One of the notable successes in the district has been the sowing down into permanent pasture (300 to 440 acres by one farmer alone) of country cultivated but not put through a root crop, which is normally considered essential for successful establishment of pastures. One of the principal reasons for this is the sowing of inoculated clover seed."

Mr R. B. Tennent, Director-General of Agriculture, who opened the Invermay farmers' conference. In 1922 Mr Tennent was appointed the Department of Agriculture's first Instructor in Agriculture for Otago and Southland.

Dairy Industry's Critical Position

"THE dairy industry is in a most critical position today through the large falls in the prices of butter and cheese, and the fat-lamb and meat industry is also on a decline with the price of lamb dropping to 19d. a pound," commented Mr R. B. Tennent, Director-General of Agriculture, in opening the farmers' conference arranged by the Invermay Research Station. "The dairy industry is facing serious times, because at the end of this season the funds in the Dairy Account will be dissipated."

The situation had arisen, Mr Tennent explained, because our most important dairy market, the United Kingdom, was saturated with dairy products. The British farmer had made a remarkable effort since the war and was highly subsidised to the extent of £235,000,000, much of it for liquid milk, the surplus of which was being made into butter and cheese. The United Kingdom was entitled to produce what it needed, but subsidisation had led to the production of dairy products in competition with ours.

More than 50,000 tons of butter were being dumped on the British market by Finland, Sweden, Eire, Argentina, and other countries. In Finland butter was selling for about 6s. to 7s. a pound, a price which local consumers could not pay and they were forced to use margarine. The butter that was not used went to Britain, where it sold for 230s. a hundredweight. The difference between the Finnish and British prices was paid in Finland to the farmer as a subsidy.

"A strong case has been made to the International Federation of Agricultural Producers against the dumping and this has been sympathetically received," added Mr Tennent. "The matter has now been placed before the British Board of Trade, and I sincerely hope that legal technicalities in the United Kingdom will not prevent recognition of our claim."

It was regrettable, he thought, that the decline in the meat market, particularly in lamb prices, should be caused through competition from sources which should be curtailed. Under the Ottawa Agreement Argentina could send meat to Britain, but New Zealand wanted a limitation placed on Argentine meat, as it was felt that the Dominion had played its part in the British Commonwealth in the past and was entitled to far better trading practices.

"We will have to look for new markets overseas for our meat. The New Zealand Meat Producers Board has established new markets and other markets will have to be exploited. The American market must be encouraged. We must ensure that quality is satisfactory, and severe inspection will be necessary to bring meat up to the standards required."

Part of Invermay's nursery area, in which 70 to 80 varieties of grasses and clovers are grown and which was shown to visitors during the field day.

Results with casting worms had been slow, but eventually an increase of over 70 per cent in spring production of pasture had come from their use. Farmers were convinced that these worms were worth while and had transplanted them into various parts of their farms.

Before the use of molybdenum 3 to 4 tons of lime per acre had been considered necessary and when molybdenum had been proved to give results 1½ tons had been thought sufficient. Results on the developed areas suggested that for at least the first 3 years of development 5 to 10 cwt. was adequate. This was extremely important in that it kept down the initial cost of development and if more lime had to be applied later to maintain production, it should be possible to do it out of income rather than capital.

With scrub land Mr Duff recommended the rolling of the scrub in autumn and winter, burning of it in August and September, and the sowing by air almost immediately after of inoculated white and Montgomery red clover at 2 lb. each per acre with some ryegrass and cocksfoot seed and 2 to 3 cwt. of molybdenised reverted superphosphate. After 1 or 2 months lime was spread by lorry, which travelled in the same direction as the crawler tractor and roller to prevent the larger unburnt stumps and trunks of the scrub causing damage.

In 2 years one farmer in the district had cleared about 1,200 acres and had a third of it growing excellent clover. Sixteen months after the first 400 acres had been sown a dense growth of white and Montgomery red clover had been dominant in the sward. The sown grasses had established and would produce as soon as the fertility was built up in, say, another year.

National Land Development

The part played by the State as a developer of land was outlined by **R. H. Scott**, Land Utilisation Officer, Department of Agriculture, Wellington, in his paper **"Land Development in New Zealand"**.

In the North Auckland and Auckland Land Districts, where the main State activity through the Department of Lands and Survey and Maori Affairs Department was centred, most of the development was on two broad land classes—the gumlands of the north and the pumice lands of the Rotorua-Taupo district.

The cost of getting some of the gumland soils into pasture appeared to be about £20 per acre, without fencing, and when developed they were capable of producing from about 150 to 170 lb. of butterfat per acre or of carrying about 3 ewes.

During the second year of development permanent pasture on pumice land would produce about 100 lb. of butterfat per acre, which would rise to 150 lb. and over as the land improved. Clearing the scrub and establishing pasture cost the Department of Lands and Survey an average of £18 10s. per acre.

"In another 25 years I think reviewers will look on the decade which began about 1950 as the hill-country decade, for it was about that time that many hill-country farmers began to try out the grassland techniques which had been perfected by farmers on the flat and undulating land of the Dominion," Mr Scott said.

Hill-country development had been going on in North Auckland, the higher-rainfall areas of the west coast of the North Island such as North Taranaki, the drier east coast hill country from Poverty Bay to the Wairarapa, the Nelson and Marlborough districts, the foothill country of Canterbury, and in Otago and Southland. Land development work was also being done on the light, shingly soils of the Canterbury Plains and on peat land in the Waikato.

Control of Weeds in Lucerne

Through the introduction of the chemical weedkiller 2,4D-B it was now considered more practical to advance the date of sowing lucerne to earlier in spring, **W. F. A. Meeklah**, Technician, Invermay Research Station, pointed out in his paper **"Weed Control in Lucerne"**.

This made it possible to squeeze in two cuts in the first season, which amply repaid the cost of weedkillers. Trials at Invermay had shown that if lucerne went into the winter with a stronger establishment and more vigour, it was less susceptible to invasion by grass weeds.

Grass weeds were probably the biggest factor in the deterioration of lucerne stands, and the life of many stands could be considerably prolonged if an efficient method of control without any serious after effects could be developed. However, the most effici-

ent grass killer yet discovered, dalapon, now placed grass control within economic bounds.

As lucerne was not completely tolerant to dalapon, work had been done at Invermay to determine the best times and rates of application. For several reasons the best time of application appeared to be in early spring just as the lucerne was coming away and was from 2 to 4 in. high. On browntop, Yorkshire fog, and barley grass at least 90 per cent control should be achieved with 4 lb. of dalapon per acre, and 3 lb. per acre would give about 75 per cent control. Over 90 per cent of *Poa annua* could be eliminated with 2 lb. of dalapon, but a safer application would be 3 lb.

Mr Meeklah stressed that when any type of weedkiller was used the crop or pasture on which it was applied had to be in good heart, or trouble would occur. Only by use of a sound fertiliser and management policy could the best be obtained from weedkillers.

Nitrogen Fertilisers on Pasture

Have nitrogen fertilisers a place in our farming economy? was the question which **R. S. Scott**, Research Officer, Invermay Research Station, set out to answer in his paper of the same title.

Nitrogen trials had been conducted at Invermay in the past 2 years to find the response that could be obtained by autumn application of a nitrogen fertiliser on second-year short-rotation ryegrass pastures, he said.

Results in 1956 had painted a rosy picture because of the mild winter, which permitted good winter growth, but in 1957 conditions were not as conducive to winter growth, so that responses were not as great as they would be in an average season. The results showed that a low rate of application gave the most efficient utilisation of applied nitrogen and that it would be more economical to apply a low rate over a large area than a heavy rate over a small area.

In the trials nitrogen topdressing had had no effect on sward composition. The 1956 series had been conducted on a sward originally low in clovers. The percentage of these had increased slightly by October in both treated and untreated plots.

The cost of nitrogen topdressing had been cheaper than buying in hay right up to the 3 cwt. per acre level in 1956, but the next season the situation had been reversed and nitrogen topdressing had not been a payable proposition at any stage compared with the cost of hay.

A very important factor was the value of fresh, saved pasture in stock health. Fresh pasture was needed before lambing for the prevention of sleepy sickness and to encourage milk production. The savings from preventing sleepy sickness alone might well outweigh the costs of nitrogen used.

Pasture Establishment

Two controversial points in pasture establishment—the sowing of rape and grass and seeding rates—were dealt with by **N. A. Cullen**, Research Officer, Invermay Research Station, in his paper **"Some Aspects of Pasture Establishment"**.

Experiments at the Station had indicated that on heavy, fertile soils the inclusion of rape in a sward was not advisable, as severe suppression might occur either from the rape or because the pasture was not grazed at an early enough stage. The harmful effects of rape were often not realised, because the growth of ryegrass might be good, giving the impression of a good sward. However, a severe check and high mortality of white clover in particular were likely to occur.

Where red clover seed production was planned the inclusion of a light rate (½ lb.) of rape could be recommended, as red clover established quite well under rape.

He recommended the practice of sowing rape and grass separately. The loss of revenue through inability to fatten lambs on the rape could be partially offset by reducing the seed mixture and thereby reducing costs of establishment.

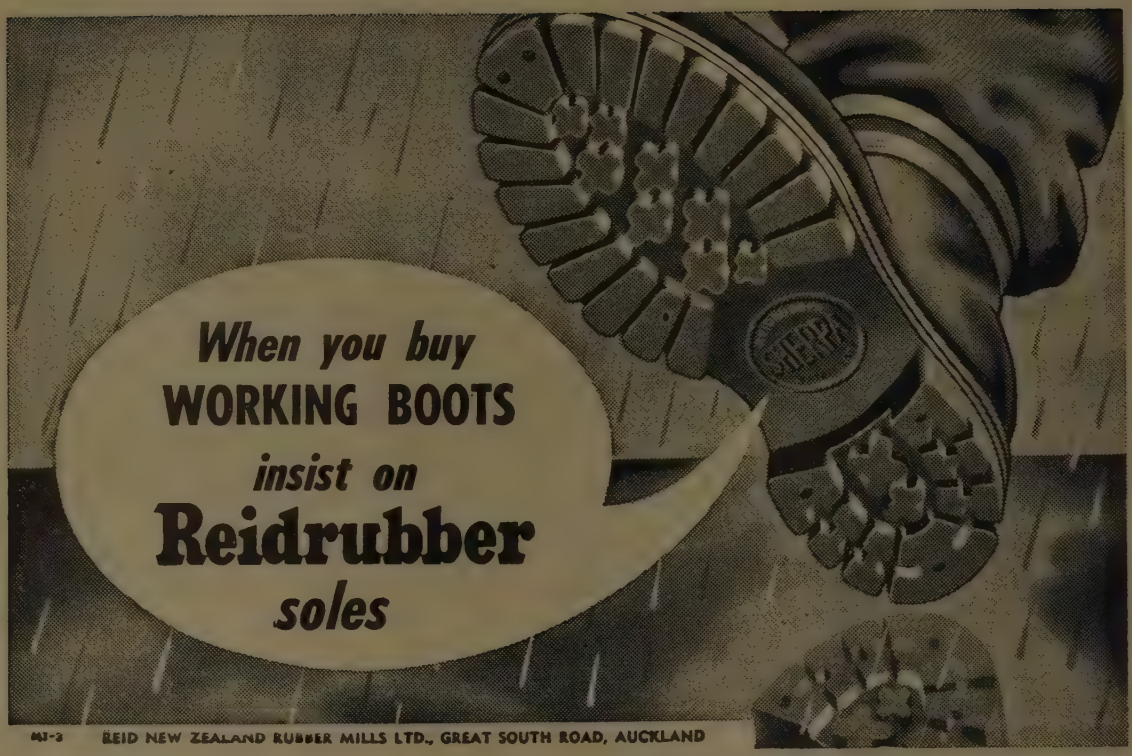
High rates of grass seed were favoured mainly because they gave greater production early in establishment, but results of Invermay trials suggested that the average rate of grass seed was unnecessarily high and could be reduced to between 20 and 30 lb. per acre without any ill effect, provided cultivation was satisfactory and weeds were not serious. This re-

The Superintendent of Invermay Research Station, G. A. Holmes (second from right), discussing work of the Station with four Otago farmers (from left), Messrs H. J. Stevenson, J. R. Polson, J. H. Mitchell, and T. Burnside, during the field day.

Higher Yield of N.Z. Cocksfoot Needed

"THERE is a lot of research work to be done in seed growing and we think that the yields of cocksfoot are lower than they should be," said G. A. Holmes, Superintendent of Invermay Research Station, in discussing seed production trials at the field day of the conference. "We are trying row cropping and have got an increase and we have also had a higher yield from use of nitrogenous fertilisers, but we can't get the yields obtained in Britain and Denmark and we want to know why.

"There is no reason why we should import cocksfoot seed and we feel certain that New Zealand cocksfoot seed is satisfactory for our requirements. If we can increase the yields, we will be able not only to conserve overseas funds, but to assure a good return to the New Zealand grower and a reasonable price to the buyer."



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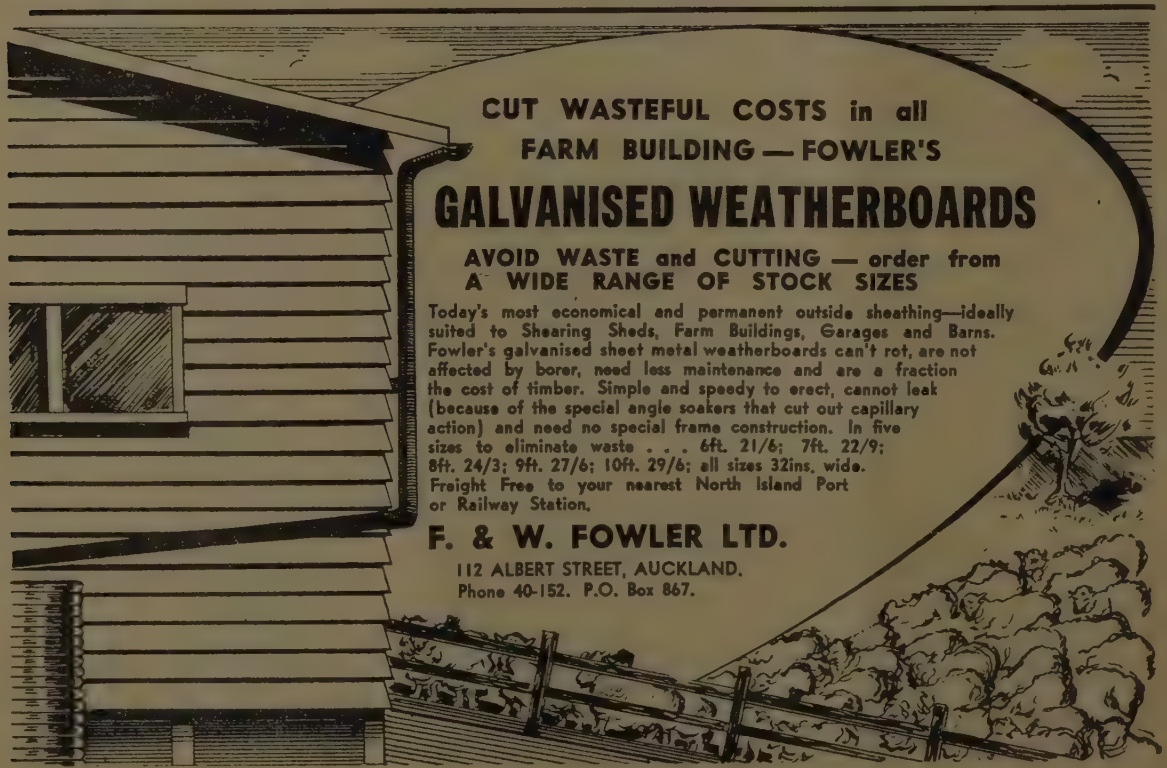
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Experimental work with various pasture mixtures has been done at Invermay for some years. At the field day details of these trials were explained to farmers at the trial plots by N. A. Cullen.

duction could best be made by restricting the ryegrass component, particularly short-rotation rye-grass.

A mixture that appeared to be giving good results on soils of high or moderate fertility was 5 lb. of perennial ryegrass, 3 lb. of short-rotation ryegrass, 5 lb. of cocksfoot, 3 lb. of timothy, 3 lb. of white clover, and 3 lb. of red clover. To give increased winter production 1 to 2 lb. of subterranean clover could also be included. On low-fertility soils, however, the inclusion of more ryegrass might be desirable to enable the young pasture to be heavily stocked in the critical establishment stages.

Fat-lamb Production

Improvement in the efficiency of fat-lamb production through breeding could be obtained in three main ways, said **Professor I. E. Coop**, Department of Animal Husbandry, Canterbury Agricultural College, in his paper **"Breeding for Fat-lamb Production"**. They were (a) breeding more productive purebred Romney, Corriedale, or halfbred ewes, (b) getting a different type of ewe which would be more productive than the purebred ewes now in use, and (c) improving the Southdown sire and/or using alternative Down sires.

Fertility and milk production were the most important characteristics requiring improvement in the ewe, but as both characteristics were weakly inherited, they were best selected for under a system of progeny testing which stud breeders were capable of conducting. Research at Canterbury Agricultural College with Corriedale ewes and at Ruakura Animal Research Station and Massey Agricultural College with Romneys had proved that open-faced ewes had higher productivity than woolly-faced ewes in the same flock and that selection within a flock for open-faced sheep could lead to rapid initial improvement.

Cheviot x Romney, Dorset Horn x Romney, and Border Leicester x Romney cross ewes all acquired high fertility (some 20 to 30 per cent higher in lambing percentage than the pure Romney) from the high fertility of the sire used and by hybrid vigour.

He believed that of these crosses the Border Leicester x Romney cross was the most suitable for the fat-lamb producer.

First-cross ewes from the crossing of the Border Leicester ram on the Corriedale and Merino had shown higher productivity at Canterbury Agricultural College than Corriedales. Work was proceeding on the Border Leicester x Romney cross, but there was reason to believe that the overall improvement over the Romney would be of similar magnitude.

The best sire to use was determined by what was the best lamb to produce. It was impossible to answer this question definitely, as market requirements changed and as the best lamb was almost certainly not the most economically produced lamb. No one breed of sire had all the virtues.

"The Southdown is nearest the ideal for very lightweight lamb and has easily the best conformation, but is the slowest growing of all and is too fat at higher weights. Other sires give a greater growth rate and leaner carcass but at some sacrifice to conformation. Most of the criticism of the Southdown could be met if and when the stud breeders produce by selection rams whose progeny will grow at about a 10 per cent faster rate than at present. Until this time there must be a place for other Down breeds which have this faster growth rate, even though it is at the sacrifice of conformation," Professor Coop concluded.

Mating of Hoggets

"Though far from being a general practice on New Zealand farms, the mating of ewe lambs has had its

adherents for many years," said **K. H. C. Lewis**, Research Officer in his paper **"The Mating of Hoggets"**.

Overseas information available to him supported the practice and indicated that the initial advantage in lamb production from the additional mating was held over the lifetime of the animal. It had also been concluded that mating of ewe lambs did not permanently check their growth and development provided their full nutritional requirements were satisfied.

For 2 years the effect of hogget mating had been studied at Invermay. Though not all animals exhibited heat in the breeding season, lambing percentages of between 40 and 60 had been obtained. Performance did not, however, appear to be related to the size of hogget at mating where ages were similar. Lambs were born an average 1 to 2 lb. lighter than those from mature ewes, but their vigour and growth rate to weaning compared favourably, and an acceptable percentage could be expected to fatten off the mothers.

Lack of development resulting from the initial lactation had been virtually recovered by the 4-tooth mating, but the extra lambs had been obtained at a small cost in wool produced in the first season. Low lambing percentages resulting from incomplete breeding activity and late entry into the breeding season could probably be improved by tupping management.

If, as seemed certain, no managerial difficulties arose at lambing or in the rearing and quitting of late lambs (which might not be so certain), a farmer might readily accept what he could get, whether a 40 per cent or 70 per cent lambing, as a credit to offset the cost of rearing a productive 2-tooth.

FIELD DAY

Of the many facets of the scientific work being done at Invermay and revealed to farmers in the conducted tours of the property arranged on the field day at the Station the most spectacular was the reclamation of the marginal, third-class, scrub-covered land on the hills to the east of the Station.

Because some gullies were too steep and other portions were too stony, not all the land in the developed area could be worked and the pockets of manuka and gorse which have had to be left present a striking contrast to the newly grassed portions alongside them and thus allow the viewer to appreciate the extent of the transformation. The developed land now carries 4 to 5 ewes to the acre from lambing to May or June.

In describing the technique of reclaiming such land the Superintendent of the Station, G. A. Holmes, told the visiting farmers that where they had gathered to listen to him on a slope covered in good pasture with a high clover content tall manuka had been growing 4 or 5 years before.

Use of Swamp Plough

Swamp ploughing was the best preliminary treatment, said Mr Holmes, the gorse and scrub being pulled under the furrow with a chain. After a winter fallow the land was worked with giant discs and tandem discs and was made ready for ridging in December. Green Globe turnips were the first crop sown and were followed either by a second crop of turnips or by a crop of swedes or rape and finally the ground was sown to grass.

"What we have done here I think a farmer on the same type of country could do more cheaply," he remarked. "The cost to us, including fertiliser and lime, is £20 to £21 an acre, but to offset this is the value of the first two crops obtained. Farmers may be hard pressed for labour to do the work, but in addition to the usual farm equipment the only machinery required is a crawler tractor, swamp plough, and giant and tandem discs. Tractors are usually idle at this time of year and could be used now for doing the work."

Mr Holmes added that neighbouring farms were carrying out reclamation of that class of land with satisfactory results. According to a reliable estimate he had been given, the developed land on Invermay would be valued at £35 an acre today and in some districts the figure for comparable land would be higher.

Farmlet Studies

The two different systems of farm management being studied in the two 24-acre farmlets maintained on the Station were explained by Mr Cullen. On one farmlet root cropping was practised with swedes and rape and on the other the all-grass system was followed. Both units were run independently of the rest of the Station and carried 6 ewes to the acre.

On the all-grass farmlet saved grass was break fed to the sheep by an electric fence and showed great power of recovery. The electric fence used, consisting of 3 wires, with the bottom one fairly close to the ground, was essential to control the strip grazing.

Mr Cullen also showed the farmers the 70 to 80 varieties of clovers and grasses grown in the Station's nursery area. These included 6 varieties of subterranean clover, 2 *Lotus* species introduced from America, and Canadian strains of timothy; there were also various herbs and Russian comfrey.

Other speakers at the field day were R. S. Scott, who dealt with drainage and minor element and fertiliser trials; Mr Lewis, who talked about the flushing and non-flushing of ewes and mating of hoggets trials; and Mr Meeklah, who described trials with chemical weedkillers in lucerne and carrots.—*J.W.McA.*

Meteorological Records for March

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	66.6	+ 2.8	84.0	45.0	0.66	8	— 3.52	0.31	25	165
Auckland	169	67.5	+ 2.6	78.5	53.2	3.03	9	— 0.12	1.96	25	168
Tauranga	10	65.0	+ 2.4	76.4	42.0	2.37	9	— 1.73	1.46	25	186
Ruakura	131	63.8	+ 2.6	80.8	40.3	1.54	10	— 1.44	0.75	25	155
Whakarewarewa ..	1006	62.6	+ 2.9	80.1	41.6	2.25	8	— 1.80	1.79	25	179
Gisborne	14	64.6	+ 2.6	84.4	39.7	1.28	4	— 2.42	0.87	25	231
New Plymouth ..	160	64.4	+ 3.4	78.8	45.6	2.40	13	— 1.34	0.61	25	184
Kariol	2125	58.1	+ 3.0	84.5	37.6	2.45	14	+ 0.11	0.56	27	
Napier	5	66.0	+ 3.6	85.8	44.0	1.90	5	— 0.68	1.29	26	234
Wanganui	72	63.8	+ 2.2	79.5	44.7	2.14	11	— 0.01	0.50	16	154
Palmerston North ..	110	63.4	+ 3.1	81.2	39.0	3.56	12	+ 1.33	1.31	26	147
Waingawa	340	62.2	+ 3.2	88.5	37.5	4.05	12	+ 1.85	2.09	26	213
Wellington	415	61.7	+ 2.3	77.2	46.6	3.12	10	— 0.06	1.13	26	164
Nelson airfield ..	5	61.0	+ 2.6	74.8	43.0	1.20	12	— 1.49	0.32	15	191
Blenheim	12	61.8	+ 1.9	83.8	39.9	0.49	7	— 1.04	0.18	10	200
Hokitika	15	59.4	+ 3.1	73.1	43.7	17.83	19	+ 8.89	4.90	9	117
Hanmer	1270	59.2	+ 3.0	87.0	31.0	1.93	8	— 1.43	0.67	15	199
Christchurch ..	22	61.0	+ 2.9	88.1	39.4	0.95	7	— 0.99	0.44	15	156
Ashburton	323	60.0	+ 2.2	89.0	34.8	1.80	6	— 0.40	0.57	13	139
Timaru	56	58.7	+ 1.3	83.1	39.4	1.60	10	— 0.53	0.72	13	127
Alexandra	520	59.6	+ 2.0	87.2	34.5	1.02	9	— 0.13	0.36	13	172
Taieri	80	57.4	+ 2.2	87.3	38.5	2.41	13	+ 0.34	0.81	10	121
Invercargill airfield ..	0	56.2	+ 2.4	74.6	40.0	2.72	19	— 1.31	0.56	15	115
Chatham Islands	140	57.6	+ 1.2	72.0	39.5	5.40	16	+ 2.84	1.73	27	

A dense infestation of Cape tulip flowering in September.

Control of Cape Tulip in New Zealand

By D. I. GLUE,
Instructor in Agriculture, Department of Agriculture, Wellington

CAPE tulip (*Homeria collina*) is an extremely serious and widespread weed of pastures in South Africa and Australia, but as far as is known, only three major infestations occur in New Zealand. These are:

1. At Woolleys Bay in North Auckland, which is about 20 miles north-east of Whangarei.

2. On Portland Island, which lies about 1 mile south of the southernmost tip of the Mahia Peninsula, about 30 miles below Gisborne.

3. At Hamilton Bay in the Marlborough Sounds, near d'Urville Island.

THE plant, a native of South Africa, belongs to the *Iridaceae* family, which includes a number of attractive garden plants which have escaped from cultivation to become naturalised weeds in this country, for example, iris, sisyrinchium, and watsonia. Cape tulip is similarly an attractive garden plant, with its long, slender leaf and its spray of salmon pink flowers, and the three infestations in New Zealand have all originated from garden escapes. Since the revision of the Noxious Weeds Act in 1950 the propagation of Cape tulip in New Zealand has been prohibited.

Life History

Cape tulip has a globular corm, the size of which may range from that of a small grain of rice to more than 1 in. in diameter. In a thickly infested area corms are to be found in great numbers in the soil to a depth of 1 ft. Counts taken on Portland Island disclosed more than 200 corms in a cubic foot of surface soil.

From February to June a germinating corm begins to put forth a single leaf very like a daffodil leaf. This grows through winter and spring, and in 3 or 4 months may be 3 ft. 6 in. long, if the plant is in fertile soil. At the same time the parent corm may be splitting up under the ground to form several new corms.

From about August the attractive, salmon pink flowers begin to appear. Up to 40 may be borne on a single spray, though they would not all be blooming at the same time. After fertilisation each flower produces a seed pod, which may contain up to 150 seeds. Thus a single corm may give rise to more than 6,000 seeds in one season while at the same time splitting up to form several new corms.

About December leaves and seed stalks dry off, become detached from the underground corms, and frequently blow over the ground, the seed stalks shedding their seeds in the process. Seed stalks frequently pile up in depressions such as gullies or sheep

For Carrying Hoggets through the Winter . . . for Banishing 'Sleepy Sickness'

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your stock do the rest!

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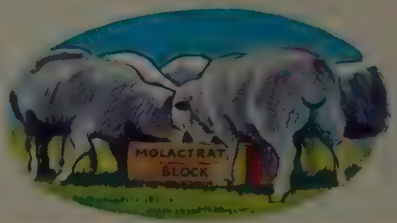


tracks, and many thousands of seeds may then fall to the ground within a small area, to give an extremely high density of infestation in future seasons. In some of the more densely infested areas at Portland Island an average of more than 3,000 Cape tulip seeds per square foot were found on the surface and many more in the top inch of soil.

The seeds are about the same size and shape as those of broad-leafed dock *(Rumex obtusifolius)*. Though the main means of spread appears to be by wind, seeds are also carried on the legs and feet or in the wool of stock and in mud on implements and vehicle tyres. A recently discovered infestation in Tasmania is believed to have started from seed in a consignment of seed oats imported from the mainland (1).

Danger of Cape Tulip

Cape tulip is regarded as a very serious weed because it is extremely poisonous, it sets seed prolifically and forms corms freely, and it grows vigorously.

Poisonous Nature of Plant

The extremely poisonous nature of the plant is well authenticated, both overseas and in New Zealand. H. E. Connor (2) states:

"In New Zealand stock have been noticed to scour freely when allowed access to Cape tulip and several deaths have occurred. Overseas, poisonings are known among sheep, cattle, horses, and man. The whole of the Cape tulip plant is poisonous and the plants are not rendered innocuous by drying.

Cape tulip corms occur in great numbers in the topsoil to a depth of 12 in.

Feeding trials conducted in Australia and South Africa have conclusively shown the toxic nature of the plant. The symptoms of poisoning are described as partly those of an acute gastro-intestinal irritant and partly those of a cerebral depressant or narcotic. Colic, scouring, weakness, dullness, and depression are produced. Death may be fairly rapid, or the animals may linger for some days before death. The poisonous principle is not known."

The three farmers on whose properties the weed occurs all affirm that the plant has poisoned stock. On Portland Island the mortality among sheep appears to have been particularly heavy, and during the winter of 1951 the farmer considered that he lost 30 sheep through Cape tulip poisoning. His description of the symptoms tallied with those given in the literature for Cape tulip poisoning.

As a further check some Cape tulip leaves were sent to the Department of Agriculture's Wallaceville Animal Research Station in April 1953 so that a feeding trial might be carried out. The station's report was as follows:

"41 gm. (about 1½ oz.) of dried ground Cape tulip leaves were administered by stomach tube to an active lamb which weighed 60 lb. The dose was given at 9.30 a.m. on 9 April and the lamb was found dead on the following morning. The post-mortem lesions were some slight inflammation of the stomach and softening and small hemorrhages in the kidney. These lesions were compatible with those described in the literature for Cape tulip poisoning. It seems that this material is very high in toxicity."

As a Cape tulip leaf looks very much like a grass leaf there is no doubt that even animals which have learnt to avoid the plant are often misled into taking in small amounts mixed in with the other constituents of the sward. This point was well exemplified at Portland Island in 1953. Areas where the weed was thick were left severely alone by sheep, but at the northern end of the Island, where Cape tulip was still comparatively uncommon in the sward, numerous instances were noted where the leaves had been grazed down along with the pasture herbage.

Prolific Seed Setting and Vigorous Corm Formation

A single corm of Cape tulip has been found to give rise to more than 6,000 seeds in a season and, at the same time, the corm split up below the ground to form several new corms. In any one year a large proportion of these corms are dormant and while they are in that stage there is no practicable way of applying weedkillers to them. As the above-ground parts of the plant die after seed has been set and the remainder of the plant is underground for about 3 or 4 months over summer and early autumn, no direct chemical control measures are possible for a considerable portion of the year.

The attractive flower of Cape tulip. The three infestations known in New Zealand originated from garden escapes.

Vigour of Growth

In all three infestations in New Zealand Cape tulip, after an initial acclimatisation period, spread rapidly and with ease through good hill country pastures. It is extremely doubtful if any hill country sward in New Zealand would be vigorous enough to keep it out.

The situation is made worse by the fact that, as Cape tulip is so poisonous that even a few leaves can kill a sheep, there is no possibility of the plants being controlled by stock manipulation or mob stocking, as is done effectively with weeds such as bracken fern and bidi-bidi. The vigour and fertility level of a sward are conditioned by the management of the animals that are grazing it, and a weed that is too poisonous to be grazed undermines the whole mechanism of weed control by pasture competition.

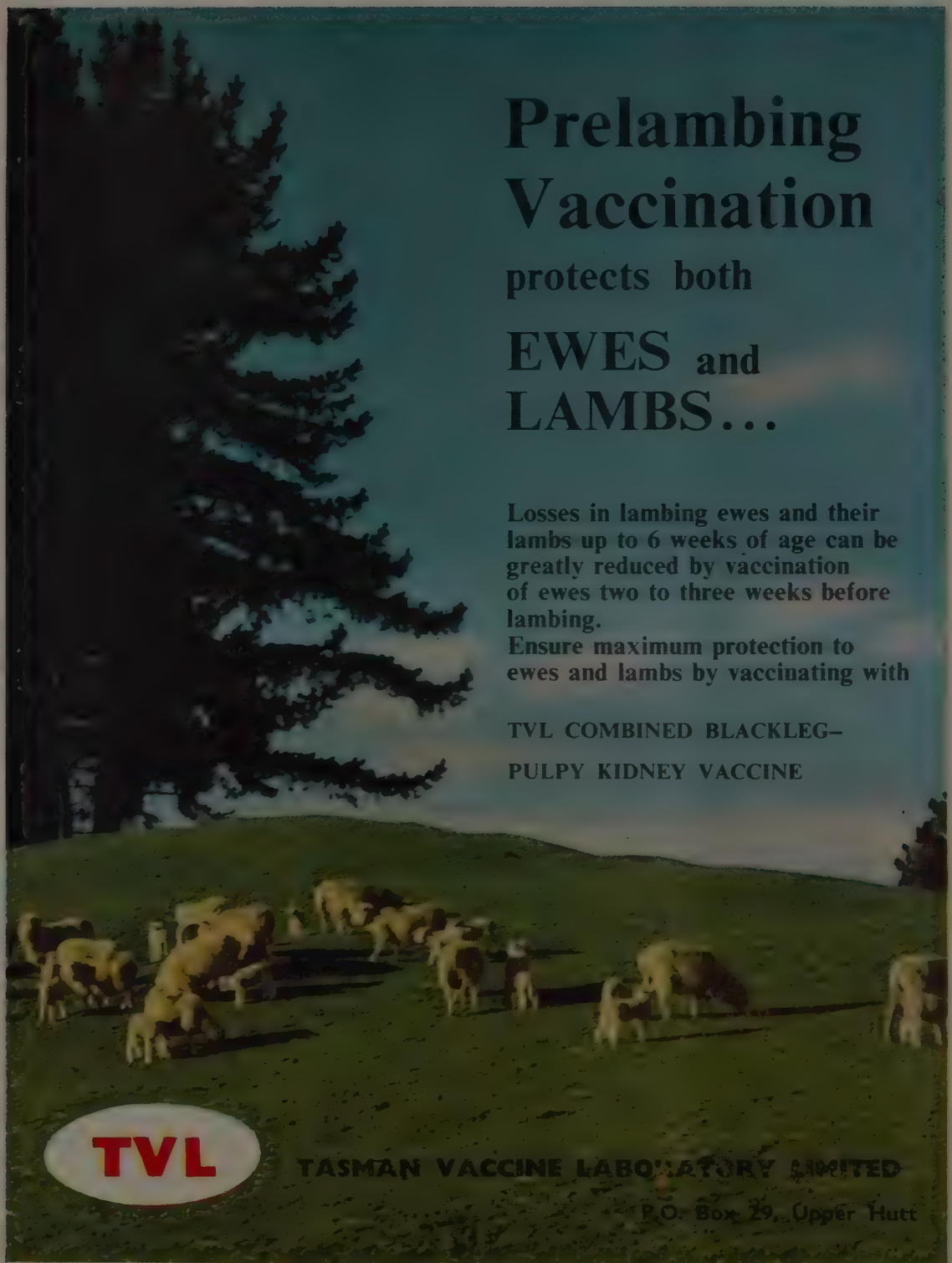
Existing Infestations

The following is an account of the three infestations of Cape tulip recorded in New Zealand:

Woolleys Bay

At Woolleys Bay Cape tulip escaped from a garden and spread into pasture on top of a small hill. Some years ago the farmer noticed that cattle were dying after eating the plant. He fenced off the infested area, which was about ¾ acre, and attempted to control the weed by spelling the area and planting pine trees where the Cape tulip was thickest.

When unstocked the area reverted to tall prairie grass, which slowed down


Prelambing
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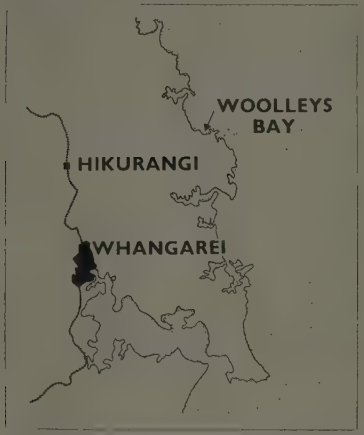
the spread of the Cape tulip considerably. However, when officers of the Department of Agriculture visited the infestation in 1952 it was obvious that the weed would never be eradicated by prairie grass alone, so the whole infested area was closely planted in *Pinus radiata* in 1953.

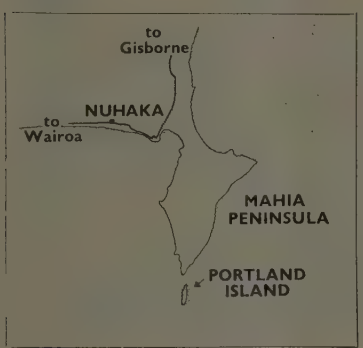


With the recent realisation of the effectiveness of hormone weedkillers against Cape tulip, arrangements have now been made to keep this area under surveillance during each growing season and spray any Cape tulip seen with ethyl ester of 2,4-D. It is expected that this infestation will be eradicated in a few years.

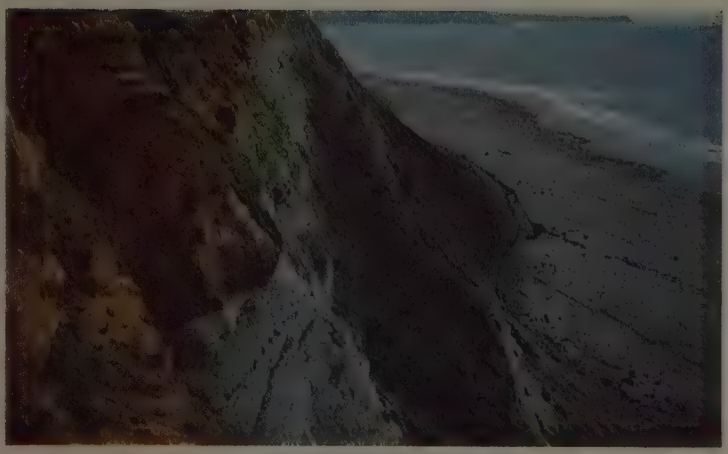
Portland Island

Portland Island is about 360 acres in area. At the southern end of the Island is a lighthouse and it is believed that the Cape tulip escaped from a lighthouse keeper's garden about 10 to 15 years ago. Its initial spread was fairly slow, but later it speeded up tremendously and by 1954 the plant had covered an area estimated at 40 to 50 acres.

The Department of Agriculture first became aware of this infestation in 1950. In 1951 trials were laid down with borax at 1 and 2 tons per acre, TCA at 100 lb. and 200 lb. per acre, chloropicrin, and various formulations of 2,4-D.



CONTROL OF CAPE TULIP IN NEW ZEALAND



Where Cape tulip occurs on steep cliffs, such as these on Portland Island, it may prove almost impossible to eradicate.

When trials were inspected in September 1951 the results obtained with the ethyl ester of 2,4-D were so promising that a large area of the Island was sprayed with 3 lb. acid equivalent of this formulation per acre with a boom mounted on a truck. However, by this date the Cape tulip had reached a resistant stage of growth and results were extremely disappointing. Further trials with ethyl ester of 2,4-D in the next year gave similar results, as the tulip was sprayed in August, by which time it had reached such a resistant stage that it took 18 lb. acid equivalent of ethyl ester of 2,4-D per acre to give good control.

In the last 3 years more trials have been carried out and results to date can be summarised as follows:

Ethyl ester of 2,4-D at 3 lb. or 4 lb. acid equivalent per acre is effective against Cape tulip if applied up to the stage when the leaf is 3 to 4 months old and up to 18 in. high. After this stage, when the flower stalks begin to appear, the plant becomes very resistant to hormones and very heavy rates are required for control.

If an area is sprayed in June or July, most of the plants present are in the susceptible stage and good kills result. However, many corms do not germinate until after July and to catch these plants it is necessary to spray again in September or October. If only one spraying is given every year, it is impossible to choose a date on which all plants will have germinated, but none will have reached the resistant stage. A further complication in obtaining complete control is the large proportion of dormant corms (frequently as high as 80 per cent.) which do not germinate during any one year. Eradication is therefore a long-term project and involves repeat spraying for many years.

The Portland Island trials show conclusively that the soil sterilants used (borax, TCA, and chloropicrin) were of little use against Cape tulip. This is not surprising when the corms are often scattered in great numbers through the soil down to a depth of 1 ft. If a corm germinates at a depth of, say, 6 in., it has no feeding roots within 6 in. of the ground surface, and young Cape tulip leaves from deeply buried corms have been seen to push through a thick layer of borax on the ground without showing any ill effects.

In 1955 the Portland Island infestation was sprayed thoroughly twice with ethyl ester of 2,4-D and individual scattered corms were dug by hand and dumped in a sheltered area, where any developing plants could be controlled easily by spraying. In 1956 the complete infestation received three further sprayings and a similar spray programme will be followed each year until the weed is eradicated. If the first spray is given early in the season, subsidiary corms, too, can be killed before they have had time to split completely away from the parent corm. Thus a number of corms can be killed with one application. The infestation on Portland Island is now very much reduced and is becoming smaller and easier to control with every spraying.

Hamilton Bay

In 1944 the farmer on the property at Hamilton Bay reported to the Department of Agriculture that a plant, later identified as Cape tulip, had escaped from the garden and was spreading rapidly over a steep sandstone hill face. Two cattle beasts had died through eating it and scouring had also been caused among ewes. This

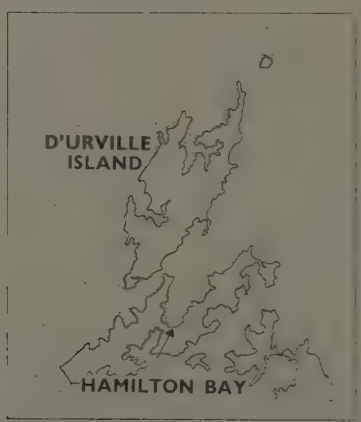
was the first record of an infestation of Cape tulip in New Zealand.

In 1944 and 1945 trials were carried out at Hamilton Bay with kerosene, flamethrowers, sodium chlorate, and arsenic pentoxide. Results were so unsatisfactory that a decision was made to plant the whole infested area, 30 acres of very steep hillside, in *Pinus radiata* for control purposes. The planting was done by the New Zealand Forest Service and the total cost of planting and fencing was about £20 per acre.

The decision to plant trees was extremely fortunate, as at that time no other satisfactory method of control was available. If tree planting had been postponed for a few more years, the weed would have covered a much larger area of extremely rugged hill country, where the difficulties of carrying out chemical control measures would now be almost insuperable.

The pine trees, which are now from 25 ft. to 45 ft. high, have been effective in preventing the spread of Cape tulip. Where the shade is densest there is no sign of Cape tulip above ground. However, digging in the soil under the trees still uncovers dormant corms in fairly large numbers, and germination tests showed that when placed in favourable conditions dormant corms from the shaded areas germinated more quickly and had a higher germination percentage than corms that had not been subject to forestry control.

How long dormant corms can remain viable is not known, but there is some evidence now that after more than 8 years in the shade the corms have reached their limit of survival. During the last 3 years a number of hitherto dormant corms have sprouted in deep shade and have produced a thin leaf which is so weak that it lies limply on top of the ground. No flowers or seeds are produced by such plants and the strain of producing a single leaf so weakens the corm that it withers and dies without splitting underground to form fresh corms.



At Hamilton Bay 30 acres of steep hillside were planted in pines to control Cape tulip.

It appears then that the tree-planted area can be regarded as neutralised and that the weed is slowly dying out there. All that is required now is a twice or thrice yearly patrol round the edges of the plantation to treat with 2,4-D some scattered plants which managed to spread from the plantation before the increasing shade given by the trees put an end to further development, and this is being done. Prospects for complete eradication of this area appear extremely promising.

Conclusion

It is a matter for congratulation that Cape tulip, which is considered by some to be potentially the most serious pasture weed in New Zealand, has been checked before it has been able to infest much steep hill country. Under New Zealand's system of livestock farming much production depends on the grazing of large areas of unploughable hill country, and for that reason pastoral farming is particularly vulnerable to weeds such as Cape tulip which are poisonous and have the capacity to spread rapidly through grazed pastures.

The lessons from control of the three infestations of Cape tulip in New Zealand are:

1. Any area of Cape tulip found should be tackled without delay.

2. Spraying two or three times during the growing season with 3 lb. or 4 lb. acid equivalent of ethyl ester of 2,4-D per acre will effectively control Cape tulip, provided it is not more than 18 in. high. Isolated plants can be dug with their attached corms and burnt or placed where they can be readily treated with chemical weed-killers.

3. In the unlikely event that the weed is found to be growing over a large area of steep, broken country where the topography is too rugged to allow the use of spraying machinery close planting with *Pinus radiata* is one of the cheapest and most effective means of control.

References

1. "Tasmanian Journal of Agriculture", "Cape Tulip in Tasmania", May 1954, p. 156.

2. H. E. Connor, "Poisonous Plants in New Zealand", Department of Scientific and Industrial Research Bulletin No. 99, p. 112 (1951).

Use of Molybdenum in Rodney County

THE first experiment with molybdenum topdressing on pasture in Rodney County began in 1950 in the Te Hana district at the suggestion of E. B. Davies, Senior Principal Scientific Officer, Department of Agriculture, Hamilton. Subsequently a number of trials were carried out in other parts of the county. The excellent responses obtained in these trials induced farmers to topdress considerable areas with molybdenum phosphate and some remarkable results have been obtained.

▲ Pasture protected from grazing by these cages clearly shows the benefits to be gained by the application of molybdenum on Puhoi clay—hill soil derived from sandstone and usually used for sheep and run cattle farming.

By C. M. BLICK,
Fields Instructor, Department of Agriculture, Warkworth

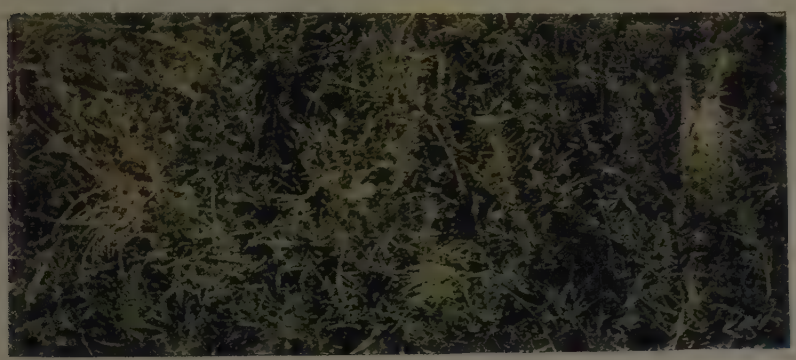
RODNEY County is in the lower portion of the North Auckland Peninsula and has a farmable area of about 270,000 acres, of which two-thirds are flat to undulating and one-third hilly. Though molybdenum responses have been obtained on both flats and hills, the hill country farmer will gain the greatest benefit.

Most of the hill country soils, on which liming is seldom economic, are derived from sandstone and these soils show a great response to molybdenum. On the other hand much of the easier-contoured soils have been well limed; up to 30,000 tons of lime have been applied annually in the county. With the consequent reduction in acidity the soil molybdenum appears to have been made available to plants, and molybdenum does not generally give outstanding responses when applied to heavily limed soils on the lower country.

Past Topdressing Practice

In the past the topdressing of these hill country soils has been confined to the application of basic slag, superphosphate, serpentine superphosphate, and a mixture of basic slag and superphosphate. Superphosphate and serpentine superphosphate alone give only slight pasture responses, but when they are sown with heavy rates of lime good pastures are often produced. Unfortunately the application of the heavy rates of lime required is not practical on hill country. Basic slag alone gives a fair response on these soils, but this finely ground material is not suitable for aerial topdressing and when it is mixed with superphosphate for aerial application the response appears to be more or less in direct relation to the amount of basic slag applied.

▼ This typically poor, cloverless hill country pasture on Puhoi clay was changed in a few months to one dominant in clover.



Experiments with Molybdenum

Experiments on these hill soils have demonstrated that molybdenum will give outstanding responses. Sodium molybdate applied alone in solution has in some instances given better responses than 3 cwt. of basic slag per acre. Pastures not previously topdressed have been changed from paspalum, danthonia, browntop pastures into dominant white clover and subterranean clover pastures solely by the application of molybdenum.

Clovers are much more susceptible to molybdenum deficiency than are grasses, and molybdenum responses are usually in the form of increased clover. After a year or more of good clover

The utilisation of all the extra growth is important if full benefits are to be obtained from the responses to any topdressing. Here a dairy herd is being control grazed on a pasture which responded to molybdenum.

Outstanding responses have been obtained on Waikare clay, which is usually of easy contour and often used for dairying.

growth it is then noticeable that the build-up in nitrogen is sufficient to stimulate the grasses, and perennial ryegrass becomes established.

Another feature of molybdenum responses has always been the increased palatability. Hill country farmers may take advantage of this by making the first application of molybdenum to the shady hill faces, where fern and manuka invasion is often a problem. These weeds may then be checked by the stock which will be attracted to these areas. In this way bracken fern was almost eliminated from the molybdenum treated plots of one trial.

One hill country experiment designed to test the effect of serpentine superphosphate, basic slag, and lime at various rates with or without molybdenum has given the following results, in which

0 means no visible difference from control;

1, slight difference from control;

2, fair difference from control;

3, good difference from control;

4, very good difference from control;

5, excellent difference from control.

	No molybdenum	Molybdenum
1½ cwt. of serpentine superphosphate plus 1½ cwt. of lime ..	0	2½
3 cwt. of serpentine superphosphate and 3 cwt. of lime in alternate years	0	2½
3 cwt. of serpentine superphosphate	0	2½
Control	0	2
3 cwt. of serpentine superphosphate plus 3 cwt. of lime ..	1	3½
3 cwt. of serpentine superphosphate plus 1 ton of lime ..	1½	4
3 cwt. of basic slag	2	4
1½ cwt. of basic slag plus 1½ cwt. of serpentine superphosphate	1½	3½

The results from this experiment indicate that there was little benefit from the application of serpentine superphosphate alone or in combination with light rates of lime. Basic slag gave a better response than superphosphate plus 1 ton of lime and slag plus molybdenum gave better results than superphosphate plus molybdenum. This seems to indicate that either the molybdenum rate was insufficient to correct the deficiency fully or that some other trace element in the slag is producing a response. It would appear to be the latter, because in another trial nearby molybdenum at 1 oz. per acre gave outstanding results.

Another interesting feature of the trial is that molybdenum alone gave a better response than either superphosphate plus 1 ton of lime or 1½ cwt. of superphosphate plus 1½ cwt. of basic slag and was equal to 3 cwt. of basic slag per acre. Therefore it seems that the best results can be obtained by applying molybdenum serpentine superphosphate and then a mixture of basic slag and serpentine superphosphate or serpentine superphosphate alone. All of these can be applied by aeroplane.

Frequency of Molybdenum Application

Because of the possibility of excess molybdenum causing an imbalance with copper the frequency of application is important. It is difficult to obtain definite evidence on just how frequently molybdenum should be applied. However, trial responses have been visible for as long as 3 years after application, though after this period there were indications that the response was declining. It is therefore considered inadvisable and unnecessary to apply molybdenum more frequently than once in every 4 years.

Rate of Application

The rate of application is also important if any possibility of a copper deficiency is to be avoided. In the North Island molybdenum superphosphate is mixed at the rate of 1 lb. of sodium molybdate per ton of fertiliser.

A landscape at Pukapuka, Rodney County. The soils in this county which respond to molybdenum are all those derived from sandstone and some which are derived from claystone, mainly gumland soils.

This mixture, if applied at 3 cwt. per acre, will provide just under 2½ oz. of molybdenum per acre, a rate which has given outstanding results; in some trials 1 oz. per acre appeared to be sufficient. Some farmers with limited finance who realise that the molybdenum is the important ingredient of molybdenum superphosphate, as the above trial results showed, have had the mixture made at double strength (2 lb. per ton) and sown at 1½ cwt. per acre, with excellent results.

Soil Responses

On the easier soils where liming has been carried out molybdenum is usually much less effective, but responses are still obtained. In one trial a slight molybdenum response was obtained on a soil which had been topdressed with lime at 6 tons per acre over 5 years. In these sandstone soils it appears that the responses obtained from heavy liming have partly been due to the molybdenum already present in the soil becoming available as the acidity is reduced. This is borne out by the fact that on a soil which would normally be considered to require 2 to 3 tons of lime per acre an excellent pasture was obtained by the application of molybdenum superphosphate plus 10 cwt. of lime.

The soils in Rodney County which respond to molybdenum are all those derived from sandstone and some which are derived from claystone, mainly gumland soils. However, the availability of molybdenum seems to vary within a soil type, as a molybdenum response has been obtained on a soil type in one area while pastures on the same soil type in an adjacent area did not respond.

The first molybdenum trial in the county was carried out in a field which appeared to be in poor heart except for patches of dark green paspalum, resembling nitrogen patches, scattered throughout the field. These patches, varying in size from a square yard to ¼ acre, may have been due to the higher availability of molybdenum.

In some instances heavy rates of basic slag have appeared to correct molybdenum deficiency, but this has not occurred on every occasion and probably it depends on the molybdenum content of the basic slag, on the rate of application, and also on the extent of the deficiency.

Molybdenum and Copper

The molybdenum : copper ratio of soils is said to be important if copper deficiency in stock is to be avoided. The copper status of most soils in Rodney County, though not high, appears to be satisfactory, but there have been instances of mild copper deficiency in cattle on soils derived from sandstone. Though considerable quantities of molybdenum have been used in the county, there has so far been no stock trouble which can be definitely attributed to molybdenum. However, farmers using molybdenum on these soils and gumland and other soils where the kauri tree has been common should watch stock for copper deficiency symptoms and apply copper if necessary.

The great improvement that usually follows molybdenum topdressing will warrant the extra expense of copper topdressing if this element becomes deficient. However, it is advisable for farmers to proceed cautiously and apply molybdenum to only a portion of the farm each year. This will ensure that any copper upset will be minimised and also the stimulated clover which is likely to increase the bloat potential of the pasture will be present on only a portion of the farm. Molybdenum is not dangerous if it is used intelligently and the subsequent reactions of livestock are observed, and farmers should take advantage of the outstanding pasture improvement that usually follows the correction of molybdenum deficiency.

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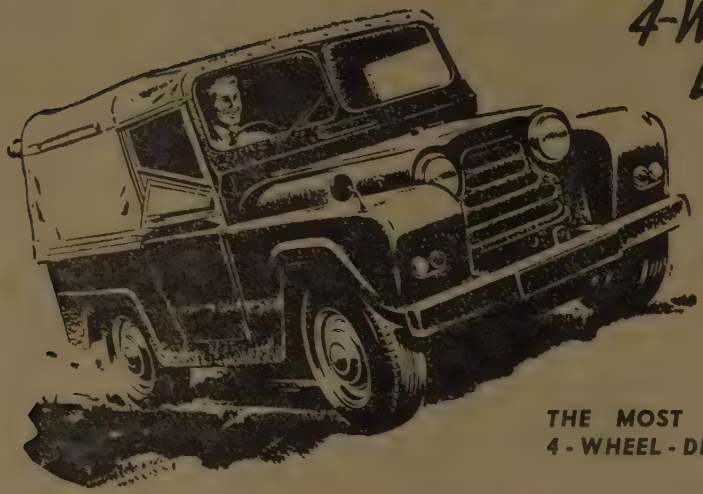

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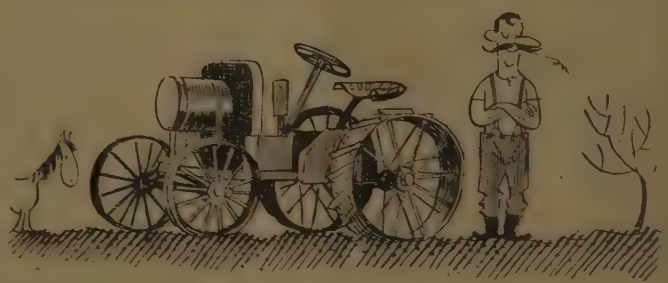

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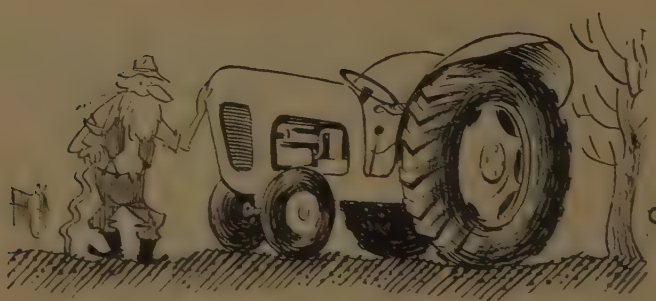

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The pressure-tank system in the pump shed in the foreground provides a reliable supply of good water for the homestead and cowshed in the background. The bore is 40 ft. deep, but the water rises to 10 ft. below the ground surface, enabling an ordinary surface pump to be used.

Homestead Water Supply

By L. H. WESTON,
Machinery Instructor, Department of Agriculture, Dunedin

EVEN today very many farm houses are dependent on rainfall for their normal water supply. In time of drought rationing of water causes much inconvenience, and if eventually water must be carted in, much time and labour will be involved. This article discusses the best methods of supplying water for the farm house with estimated costs.

ILLUSTRATED above is the shed containing the pressure system which supplies water to the house and cowshed on a farm on the east of the Taieri Plain near Dunedin. For many years the house had been supplied by rainwater stored in a 3,000-gallon concrete tank. Unfortunately the tank required much attention and still loses water. An emergency supply of well water was normally used in the cowshed, but was of poor quality, being highly mineralised.

The farmer hired a well-boring contractor who knew the district. A well was drilled near the cowshed but yielded poorly. Another site was chosen some 100 yds. further out in the paddock. Here a good supply was found and a pressure system was installed. This can automatically supply water to the house, cowshed, and drinking troughs.

A ¾ in. polythene pipe has been used from the pressure tank to the cowshed and will be extended to the house. The back portion of the farm is supplied by 300 ft. of ½ in. polythene pipe. The pump is capable of delivering 200 gallons per hour.

Costs

	£	s.	d.
Boring and testing 40 ft. well	50	0	0
200-gallon-per-hour pump and pressure tank	63	15	0
Motor, electric cable, and labour charges	28	0	0
Digging trench by machine for pipe and cable	10	10	0
Piping (polythene): 700 ft. ¾ in.	47	0	0
300 ft. ½ in.	10	0	0
Fttings	3	0	0
Shed materials	8	0	0
	220	5	0

Alternatives

There are no reliable streams in the area, so the only alternatives to the above scheme would have been by

(a) Increasing rainwater storage or

(b) Using the poor well water.

Rainwater would be required for drinking and washing in the house as well as for some uses in the dairy. The requirements could vary greatly according to the habits of the occupants. An estimate of the rainwater required is as follows:

	Gallons per day
Five people	125
Dairy, washing, etc. ..	25
	150

To be sure of 2 months' supply of rainwater, storage of 9,000 gallons should be allowed. At the moment total storage is about 4,000 gallons. A 5,000-gallon underground storage tank would cost about £60 for materials or about £200 if built by contract. Two ready-made concrete tanks of 4,000 and 2,000 gallons could be obtained for £160.

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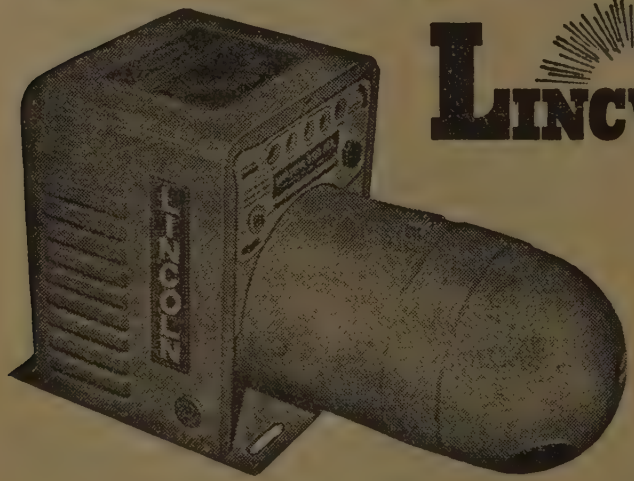

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In addition to this rainwater the old well-water supply would need extending to the house for the closet and the garden and to the trough at the back of the farm in addition to the cowshed. Pressure could be obtained from a high tank, but even so ¾ in. pipe would be required to ensure good supply. If a pressure system were used, ½ in. pipe would suffice.

If a storage tank were built by the farmer and a high tank system used with the old well, possibly a little saving could be made, but much labour would be involved. Other alternatives are certain to cost more than the new well system that has been installed and with which there is no chance of using poor water in the house and dairy, as this system now supplies good water everywhere.

If this supply of good water had not been found, the old well water probably could have been purified. Filtration and purification equipment is available, but must be specially chosen and designed according to the impurities, so first a sample of the water would have to be tested. The cost of such a unit is usually about £200. These units should not be confused with the small drinking-water purifiers available for £4 to £5.

Well Boring

In some areas well boring is certain to obtain water. Dozens of bores producing good water demonstrate that the ground beneath has ample supplies. The plains and river terraces are fairly reliable sources of water, but on most of the rolling and hilly country water-bearing strata are irregularly placed. Farmers on such country should consult a geologist of the Department of Scientific and Industrial Research. An article in the "Journal of Agriculture" of March 1952, "Ground Water in New Zealand", shows how scientific knowledge can help with this problem.

Many people claim to be able to find water. Some years ago 75 diviners were tested and not one proved reliable. It is doubtful whether a spot chosen by a diviner would be better than a place chosen at random, though some diviners have had so many years of experience that they automatically search in likely places. The value of their divining has yet to be proved.

The farmer should

1. Note the situation of the neighbouring wells and choose a likely area based on this observation.
2. Choose an area handy to electric power.
3. Choose a central point so that pipelines can be kept as short as possible.
4. Request information from the Department of Scientific and Industrial Research and supply a map reference of the areas in which it is desired to bore, with a sketch of the farm boundary.

The cost of boring will depend on the size of the casing and the depth of the well. Extra charges may arise if the drill strikes much hard rock. A drilling firm may use small pipe, 2 in. for example, to reduce costs to as low as £1 a foot. Other firms may have a minimum size of 3 in. and a basic charge of about £2 a foot. Unexpected difficulties can add considerably to well-boring costs. On rolling country deep wells requiring expensive pumps are not uncommon, so if finances are limited, a polythene pipeline should be considered, as £110 will buy ¼ mile of 1 in. polythene pipe. Where drilling costs are likely to be high it may pay to pump from a river rather than take the risk of boring to an unknown depth.

The pump shed has a 200-gallon-per-hour pump and a 45-gallon pressure tank. The maximum pressure is 40 lb. per square inch, and the full pump capacity is received at the house through the ¾ in. supply pipe. Electricity is supplied through an underground cable and a point is provided for defrosting in frosty weather.

Pipelines

Polythene plastic pipe and a new type of plastic pipe which recently became available owe their popularity to several things, notably:

Long life: The pipes do not corrode or require early replacement. A pipe 10 years old should be as good as new and supplying as much water as when first installed.

Frost resistance: Exposed pipes can be frozen up without damage to the pipeline.

Easy installation: Pipe lengths of up to 600 ft. can be pulled into the ground by a mole plough. This is not possible in rocky ground or where the subsoil is particularly sticky.

There is a fallacy that polythene pipe is equal to larger iron pipe. Usually the same size of pipe would be necessary irrespective of the material used. If a large iron pipe was necessary because of the danger of its rusting up, a size smaller polythene pipe might possibly do. The size of pipe should always be chosen with

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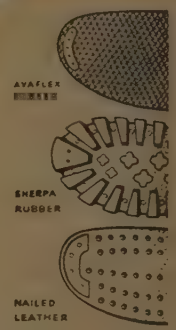

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regard to the pressure of water in the pipe, the pipe length, and the quantity of water required for delivery. The accompanying table shows the flows that can be expected from different pipelines. If a pressure tank is used, 43 lb. pressure will equal 100 ft. head, whereas 65 lb. pressure will equal 150 ft. head.

FLOW THROUGH VARIOUS-SIZED PIPES IN GALLONS PER MINUTE

Length of pipeline	Height of water in feet head 20	50	100	150
ft.	gallons	gallons	gallons	gallons
½ IN. PIPE				
50 ..	3.30	5.19	7.38	9.07
100 ..	2.34	3.66	5.21	6.41
200 ..	1.65	2.59	3.68	4.54
300 ..	1.35	2.10	3.01	3.70
400 ..	1.17	1.83	2.60	3.20
500 ..	1.04	1.64	2.33	2.87
1,000 ..	0.74	1.16	1.65	2.03
2,000 ..	0.52	0.82	1.17	1.43
3,000 ..	0.43	0.67	0.95	1.17
5,000 .. (nearly 1 mile)	0.33	0.52	0.74	0.907
¾ IN. PIPE				
100 ..	6.41	10.14	14.38	17.67
500 ..	2.87	4.54	6.44	7.90
1,000 ..	2.03	3.21	4.55	5.59
2,000 ..	1.43	2.27	3.21	3.95
3,000 ..	1.17	1.85	2.62	3.22
4,000 ..	1.015	1.60	2.27	2.80
5,000 ..	0.907	1.43	2.03	2.50
7,500 ..	0.740	1.17	1.66	2.02
1 IN. PIPE				
100 ..	13.20	20.90	29.50	36.30
500 ..	5.92	9.35	13.22	16.25
1,000 ..	4.18	6.61	9.35	11.50
2,000 ..	2.96	4.67	6.61	8.12
3,000 ..	2.41	3.81	5.40	6.63
5,000 ..	1.87	2.95	4.18	5.15
7,500 ..	1.52	2.41	3.41	4.20
10,000 ..	1.32	2.09	2.95	3.63

A milking cow may drink up to 15 gallons a day and a ewe with lamb 1½ gallons a day. Therefore a flow of 1 gallon per minute will supply at least 100 dairy cows or 1,000 ewes.

For a house supply speed is important, and though a pipe may carry the day's needs, it may be tediously slow. In practice it is desirable to have 1 gallon per minute for the house itself plus an additional gallon per minute for the garden hose. When using polythene pipe make certain that pressures are not too high. Heavy-weight pipe is available for any stretches that are under high pressure.

SAFE WORKING PRESSURE FOR VARIOUS PIPE SIZES

Pipe	Safe working pressure lb./square inch	Feet head
Galvanised iron pipe		
Up to 2 in. size ..	433	1,000
Polythene plastic		
½ standard ..	135	312
½ heavy weight ..	230	531
¾ standard ..	100	231
¾ heavy weight ..	150	346
1 standard ..	80	185
1 heavy weight ..	115	265
1¼ and 1½ standard	65	150

When a pipeline is to carry water up or down a high hill it may be necessary to use stronger pipe near the bottom or make some other provisions against high pressure.

Polythene pipe is flexible. When laying it take precautions against sharp bends that would restrict flow. The pipe should be buried at least 18 in. deep, but preferably below 2 ft., and in addition the pipe should be protected with an outer iron pipe beneath roadways or tracks.

The Pressure-tank System

An ordinary storage tank can be kept full automatically, but the pressure tank has additional advantages as follows:

1. The pressure tank does not have to be higher than the highest point to be supplied; it can be anywhere.

2. Smaller pipes can be used and costs greatly reduced.

3. Maintenance of a large tank and a stand is avoided.

4. Good flow and pressure for a hose can always be obtained.

Usually a pressure system can be installed for much the same cost as an automatic pump and gravity tank on a stand. Sometimes the cost of the pressure system is substantially less.

Automatic systems will require electric power, but so great are the advantages that as much as £200 could be well invested in the power supply. The farm can be left for several days without fear of any shortage of stock water. Then, too, there is no temperamental petrol motor to give trouble and require overhaul or replacement.

On the other hand a power failure during a storm could be embarrassing. A small rainwater supply at the house would overcome this difficulty. The pump water may also be hard or corrosive. In such cases a rainwater supply for the hot-water supply may be advisable. If there is any doubt about the quality of the water supply, it should be tested by arrangement with the Department of Agriculture.

Pressure-tank systems in which the tanks comply with the requirements of the Marine Department can work at up to 180 lb. per square inch or more, which may be necessary to supply water to hilltops. High pressure, however, will result in higher power costs, so it pays to run the system at a pressure no higher than necessary.

The accompanying table shows the minimum pressures required to send water up hillsides. For an efficient supply maximum pressures of 10 lb. to 20 lb. per square inch higher than that shown will be necessary.

Height in feet of supply point above pressure tank	Approximate pressure in pounds per square inch
50 ..	22
60 ..	26
70 ..	30
80 ..	35
90 ..	39
100 ..	43
120 ..	52
140 ..	61
160 ..	69
180 ..	78
200 ..	87
225 ..	97
250 ..	108
275 ..	119
300 ..	130
350 ..	151
400 ..	173

Finally, a precaution that must be taken with pressure systems is to see that the cushion of air that is essential to their operation and that is gradually dissolved and removed from the cylinder is replaced occasionally. High-pressure systems in particular must be attended to regularly. Instruction should be obtained from the maker or supplier.

Now that so many farm houses in New Zealand are supplied with power many more farmers will be able to avail themselves of the advantages of the pressure-tank system. Working from a well or stream it automatically gives an effective supply of water and requires a minimum of attention. If good water is available, this is undoubtedly the most effective method of utilising it.

Revised Lucerne Bulletin

LUCERNE is one of New Zealand's most important fodder crops, being rich in minerals and proteins and capable of high production over a wide range of soils and a great diversity of climates. In the last 25 years the area of lucerne cut for hay and silage in New Zealand has increased from 30,000 to 94,000 acres, but the Department of Agriculture considers that the total area planted with the crop is still relatively small when the merits of lucerne are considered.

Because of the crop's value and the increasing interest in it the Department has revised and reissued Bulletin No. 155, "Lucerne", which can now be obtained at offices of the Department.

The bulletin describes the soils and climates of districts throughout New Zealand which are suitable for the crop, including its performance under a great variety of conditions. Other sections describe advantages and disadvantages of lucerne, preparation of seedbed, seed strains, sowing, management of the stand, weed control, grazing, lucerne-grass mixtures, seed production, and control of pests and diseases.

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hill farms is about £17 per ton or about 34s. per acre when applied at 2 cwt. per acre. On the basis of present prices for produce this practice is economic.

Sheep Breeds and Crosses

In the early days of settlement only cattle were run, mainly Shorthorn cattle, which were bred and sold to the farmers on the easy country for fattening. Later beef breeds were introduced and Polled Angus and Herefords became the most popular breeds. Today the Polled Angus is the predominant breed, though many Hereford and Hereford-cross cattle are still used.

Even Jersey and Jersey crossbred cattle have been used to quite a considerable extent at times. Sound empty cows, run with the bull and sold when in calf, have proved quite a profitable sideline for many farmers, especially on the easier country. Many again have bought weaner calves, kept them and mated them, and sold them as in-calf 2- or 3-year-old heifers. Though the running of these classes of stock has been quite profitable, especially when wool prices were low, the stock are not suitable for the work they are required to do and the country has suffered in consequence.

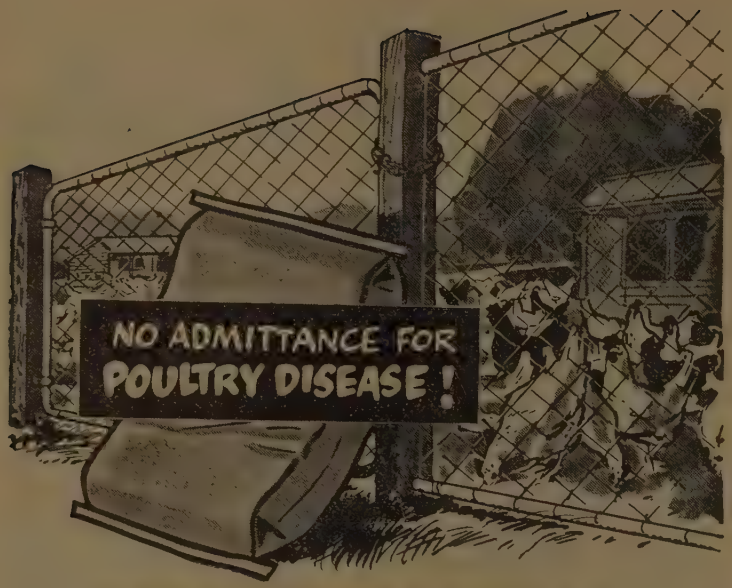
The raising of Jersey heifers has still an important place on sheep farms on the richer fattening country, however, where the calves do particularly well if well managed and command a hign price when sold back to the dairy farmer as in-calf heifers. Large numbers of in-calf heifers not required in Taranaki are bought by dairymen in Waikato and the demand for them is keen.

The Lincoln was the popular sheep breed in the early settlement period of this hill country. Its main attribute was the heavy fleece and also the fact that, on country where there was much timber about, the wool was not dragged off the neck and belly as with other breeds. However, Lincolns are more suited to heavy, rich land and soon great difficulty was experienced in rearing the sheep past the hogget stage. The Lincoln also was not a good forager on the steep hills and it was gradually replaced by the Romney.

The outstanding changes in sheep farming in Taranaki in the past 30 years have been the replacement of Lincoln-cross sheep by Romney-cross on all the steeper country and the development of the fat-lamb industry, in which the Romney-cross ewe and the Southdown ram have been used, on the easier hill country. Four- and 5-year-old Romney-cross ewes bought from the farmers on the steeper hill

Access to some of the back areas of hill-country farms in Taranaki is poor and tracks have to be constructed by farmers. The maintenance of these tracks is sometimes costly.

Deteriorated land in North Taranaki being developed from tall scrub and bracken fern.



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compensate for the extra eggs laid. For this reason where lighting is used the pullets must have free access to dry mash or pellets during the period that they are under light.

This may raise doubts in the minds of those who have had trouble with rats. Food left in a poultry shed overnight is an attraction for rats, and extra precautions may be required to free the poultry run of them.

Installation Not Elaborate

All that the average household poultry keeper will require for the usual six to a dozen pullets in a poultry shed is one electric point centrally placed on the roof inside the shed. A 40-watt globe backed by an ordinary enamel household lampshade or reflector is sufficient to give all the light required in a small unit.

When to Light

Laying birds need about 12 to 14 hours of light—natural and artificial—during winter to stimulate satisfactory production. Obviously as the days grow shorter more hours of artificial lighting become necessary. Commercial egg producers achieve this by using an automatic time switch which can be adjusted to put lights on and off at any pre-determined times. This is undoubtedly the most efficient and easiest method of controlling artificial lighting for poultry, but a householder may not wish to go to the expense of buying one of these time switches. It is worth noting, however, that some local power boards have from time to time second-hand switches of this kind for sale at reasonable prices. A householder who is not prepared to buy a time switch has a choice of two alternative systems.

What is termed an "evening light" can be quite effective. This is switched on as daylight fades in late afternoon or early evening and switched off again before the owner goes to bed. There is only one difficulty with this system—the light must be dimmed for a few minutes before it is switched off. Unless this is done, birds on the floor will be left stranded when the light goes out and be unable to find their way to the perches. A small rheostat in the circuit will soon overcome this difficulty.

The alternative is to place, say, two or three dim red lamps (that is, of lower power, say 15 watts) directly over the perches. These can be left on all night. It has been found that the red part of the light spectrum is mainly responsible for stimulating the pituitary glands. Apparently subjecting the birds to a long period of dim red lighting is as effective as shorter periods of brighter white lighting. This system presents no difficulties in either installation or running.

Does Lighting Pay?

In 1949 the Department re-established a breeders' laying trial at the Poultry Demonstration Plant, Upper Hutt. Breeders who entered pens sent 20 pullets and the production of each bird was recorded over a period of 48 weeks. For the first 5 years no artificial lighting was used, but in 1955 the house used for this trial was wired and 12 hours per day of natural and artificial lighting were given to the birds during winter. The graph on page 449 makes it very clear that lighting increased the winter egg production. Further proof of the efficiency of artificial lighting is unnecessary.

Length of Lighting Time

Normally artificial lighting is started in late April or at the beginning of May. The lighting time should be gradually increased as the days shorten, and gradually decreased as the days lengthen and the flush season for eggs approaches, namely, late August or early September. **Decrease the lighting time gradually before cutting it off completely. Never cut the lights out suddenly**, as if this is done, there is a grave risk of throwing the birds into moult. For the same reason great care should be taken not to miss putting the lights on every night during winter. A missed night or two will quickly affect egg production.

Ruakura Farmers' Conference Week

A WELL diversified programme has been arranged for the tenth Farmers' Conference Week of the Department of Agriculture's Animal Research Station, Ruakura, which will open at Ruakura on Tuesday 17 June and continue until Friday 20 June. On the first day the papers, as in past years, will be on subjects of interest to sheep farmers. Wednesday will be devoted to the field day, with the evening set aside for "Question Time" at Ruakura. Sheep and dairy farmers are catered for on Thursday and there is a special day for dairy farmers on Friday.

Farmers from the inception of the Conference Week have in ever increasing numbers taken advantage of the opportunity offered to get to grips with problems and subjects of vital interest to them. The popularity of the conference with farmers has led to the erection of a new hall on the Station; it will be used for the first time at this conference.

As in other years the field day on Wednesday will be a feature. Farmers can see and discuss the work of the sheep and dairy sections at Ruakura and at the Hill Country Research Station at Whatawhata.

Dr C. P. McMeekan, Superintendent of the Station, will give the opening paper of the conference, his subject being British meat production methods and their impact on the New Zealand meat industry. Mr J. W. de Gruchy, general manager, New Zealand Meat Producers Board, will give an address on Tuesday evening on meeting the changing market for meat. On Thursday evening Mr A. H. Ward, general manager, New Zealand Dairy Board, will speak on meeting the changing market for dairy products.

Leading New Zealand research workers for primary industry will give topical papers and other speakers will be Mr I. A. M. Lucas, Rowett Research Institute, Scotland, and Mr T. R. Ellett, dairy farmer, Auckland.

An outline of the programme is as follows:

SECTION FOR SHEEP FARMERS

(Tuesday 17 June)

Morning: "British Meat Production Methods and Their Impact on the New Zealand Meat Industry" (C. P. McMeekan); "Recommended Techniques for the Hill Country Farmer" (E. A. Clarke); "Wear in Sheep's Teeth" (C. R. Barnicoat).

Afternoon: "Current Ideas on Raising the Lambing Percentage of Sheep" (I. J. Inkster); "Breeding Romneys for Better Lambing Percentages—a Progress Report" (L. R. Wallace); "Studies on the Dry Ewe—a Progress Report" (D. G. Edgar).

Evening: "Meeting the Changing Market for Meat" (J. W. de Gruchy).

SECTION FOR ALL FARMERS

(Wednesday 18 June)

Field day.

Evening: "Question Time" at Ruakura.

SECTION FOR ALL FARMERS

(Thursday 19 June)

Morning: "Lamb Deaths from Birth to 6 Months" (C. D. Dodd); "Hormone Implants for Beef Production" (I. A. M. Lucas); "Hormone Implants for Wool Production" (D. A. Ross).

Afternoon: "Crossbred Beef from Dairy Cattle—a Comparison of Aberdeen Angus, Shorthorn, and Hereford x Jersey Cattle" (D. K. Walker); "Common Poisonous Plants" (M. R. Coup); "Circulation Cleaning" (D. S. M. Phillips); "Planning Winter Feed" (J. D. J. Scott); "DDT and Grass-grub Control" (A. V. Allo); "Weeds in New Pastures" (F. B. Thompson).

Evening: "Meeting the Changing Market for Dairy Products" (A. H. Ward).

SECTION FOR DAIRY FARMERS

(Friday 20 June)

"British Milk Production Methods and Their Impact on the New Zealand Dairy Industry" (C. P. McMeekan); "Some Common Misconceptions about A.B." (J. P. James); "Some Problems of the Town Milk Producer" (T. R. Ellett); "Further Studies of Strip Grazing" (I. A. M. Lucas); "Wintering Cows on A.S.P." (L. R. Wallace); "Infertility in the Dairy Herd" (T. J. McClure).

Care of Livestock during June

Contributed by the Animal Research Division

SOWS and store pigs should be fed on roots, grass, and up to 1 lb. of meat meal or other high protein feed daily. Grazing pigs should not be confined to small paddocks during winter. The use of large grazing areas will reduce pasture damage considerably. Warm accommodation is essential for winter store pigs to avoid losses and maintain steady growth.

PIG PRODUCTION

Early-farrowing sows should be put in their farrowing quarters and fed 3 lb. to 4 lb. of meal daily. After farrowing they should be fed 4 gallons of milk plus 2/3 gallon for each piglet suckled. Where insufficient milk is available meal should be used to replace the milk in the ratio of 1 lb. of meal to 1 gallon of milk. Constipation, which is common in late pregnancy, can be avoided by feeding ½ lb. of bran daily or 4 oz. of molasses two or three times during the last 10 days before farrowing.

Experiments have shown that cows fed well during winter will product from 26 lb. to 63 lb. more butterfat in the following lactation than those which have been poorly fed during winter. These results were obtained when both groups were well fed after calving. It is therefore very important to feed the cows well from now until calving, so that they will have ample body reserves to draw on during the first 2 months of the lactation.

WINTER FEEDING OF DAIRY COWS

It is difficult to build up these body reserves with even liberal amounts of hay and/or silage unless some grass is also available throughout the dry period. With a portion of the farm closed for autumn-saved pasture for feeding after calving it is particularly important to graze the rest of the farm under a controlled rotational grazing system with adequate spelling between grazings, both to ensure continued grass growth during winter and to ration what grass is available throughout this period. Where subdivision is inadequate for this purpose break grazing with the electric fence is essential. Since cows will eat grass in preference to most other feeds, they should be fed as much hay as they will clean up in addition to 20 lb. of silage per cow per day.

In areas where sheep become infested with liver fluke flocks should be drenched now. The only effective drug is carbon tetrachloride, which should be mixed with four times its volume of liquid paraffin. The dose of the mixture is 5 c.c. for sheep of all ages, and 1 gallon is enough for about 900 sheep. Further information about liver fluke in sheep and cattle will be found in Bulletin No. 248, which is available from the nearest office of the Department of Agriculture.

LIVER FLUKE IN SHEEP

Worms are sometimes still troublesome in May and June, and if lambs or calves are not doing well, they should be drenched with phenothiazine at the full dose rates recommended by the manufacturers. Further information about worms and drenching will be found in Bulletins No. 171 and No. 189, which are obtainable from the nearest office of the Department.

WORMS IN LAMBS AND CALVES

Poultry lice can cause considerable loss of condition in birds and reduced egg laying. To control these parasites a fine trickle of 40 per cent. nicotine sulphate should be run along the perches on a calm night before the birds go to roost. Two or three treatments should be given at weekly intervals.

LICE ON POULTRY

Rickets in lambs occurs frequently during winter in Canterbury and other South Island districts. It is also occasionally seen in the North Island. Lambs wintered on green oats or barley are most susceptible, but other green feed or good pasture may also produce the condition. It can be prevented by giving one dose of 25 mg. of calciferol (a vitamin D concentrate) at the beginning of winter. This preparation can be bought dissolved in olive oil with full instructions for use. Even where rickets does not occur this treatment may induce better growth in lambs during winter. It is unlikely to be beneficial during autumn, and the best time to administer it is about the end of May.

RICKETS IN LAMBS

Pastures and Crops

Seasonal Notes by the Extension Division

THE rapid increase in aerial topdressing has necessitated the formation of airstrips on farms in many parts of the country. For safety and efficiency of operation these strips require care in construction and maintenance.

MAINTENANCE OF AIRSTRIPS

A RECENT survey of farm airstrips in the Auckland Province indicated that on 56 per cent. of them major repairs and even reconstruction, resurfacing, or regrassing were required. On another 30 per cent. some improvements were necessary, and only 14 per cent. were in reasonable order.

Immediately flying operations cease in autumn the strip should be grazed with a large mob of sheep and then harrowed severely. Hollows, wheel and skid marks, and worn places should be filled in with soil. Hillocks may require grading off. After any loose soil has been rolled the area should be resown with a seeds mixture of 4 parts of chewings fescue, 2 parts of browntop, 1 part of crested dogstail, and 2 parts of perennial ryegrass, using from up to 40 lb. per acre on bare areas down to nothing on good turf. Phosphatic fertiliser should be applied at the same time. Clover is undesirable, as it forms dangerous, slippery patches, especially when wet. To maintain thrift in the sward and develop a hard-wearing turf mat 1 cwt. of sulphate of ammonia should be applied in May and again in August.

Undesirable practices to avoid are: grazing the airstrip with cattle and horses; using it as a farm roadway for stock, tractors, and trucks; cutting the strip for hay or silage, and feeding out hay or silage on it. All these make both the surface and sward dangerously uneven.

—E. H. ARNOLD

* * *

GRAZING OF AUTUMN-SAVED PASTURES

FOR autumn-saved pasture, fields are usually closed from April onward so that some are more forward than others in late May and June. Until then the dairy herd and other stock should be on a maintenance diet of hay or silage or both, but after that there is need for an increase in high-quality feed, particularly for early-calving cows. These more forward fields should then be break-grazed lightly with the aid of the electric fence. Hard grazing at this time is not desirable. If these lightly grazed fields are then spelled, they will provide further growth for feeding in late winter or early spring.

Where the saved pasture tends to get too long on some fields the whole herd should be used to graze over these fields quickly to reduce the excessive growth. Pastures that are too long are lower in palatability and digestibility, the bottom becomes slimy and fungus infested, the clovers are suppressed, and recovery is poor.

As winter progresses and the stock demand more and more highly nutritious feed break grazing can be harder. The extremes of lax and hard grazing should be avoided, as the former increases Yorkshire fog and the latter increases clovers and weeds.

—J. R. MURRAY

* * *

OPEN DRAINS

THOUGH maintenance work in many smaller open drains can be done quite efficiently by hand labour, a number of fairly simply drain-cleaning attachments are now available for farm tractors which, because of their reasonable cost, can be owned by farmers. Most of these machines work on the principle of bevelling one side of a drain and pulling weeds and silt up this sloping side. Many farmers consider this drain, with one sloping side, an advantage, as it enables stock to get out more easily if they fall into the drain.

TILE DRAINS

Where new tile drains are to be laid, whether the trenches are dug by hand or machinery, several important points should be observed. Tiles should never be laid less than 2 ft. below the surface. The trench bottom should be graded carefully to ensure that there is no loss of fall and tiles should be laid with great care; they should be butted together as tightly as possible and packed either side with earth to ensure that they remain in a straight line during the backfilling operation. For junctions it is preferable to use commercially produced Y or T junction pipes, as this saves time and often many broken tiles. Any filling of errors in grading where a trench is dug too deep should be done with shingle or scoria.

—D. F. SCOTT

* * *

APHID CONTROL IN BRASSICA SEED CROPS

INFESTATION of crops of rape, kale, and chou moellier by aphids is a common cause of reduced seed yields and, occasionally, of complete failure of the crops. The high per-acre return from a good crop makes control measures profitable. The potential damage to bees and other beneficial insects is such, however, that the insecticides have to be applied to these crops at times of minimum danger. Between the end of March and the beginning of September no permit is necessary and spraying should be done within this period.

AUTUMN AND SPRING TREATMENT

Autumn treatment aims at the elimination of the over-wintering generation of aphids and hence reduces the danger of spring infestation. Treatment in early spring will prevent infestation during the flowering period.

Recommendations for both times are the same. Either lindane or "Metasystox" can be used. Lindane is a contact and stomach poison. Apply ½ lb. per acre in 12 gallons of water for an average crop and in 15 to 20 gallons for an exceptionally leafy crop. "Metasystox" is a contact poison but has the additional advantage that it is absorbed into the sap of the plant and continues to act for several days as a systemic insecticide. The recommendation is 16 fl. oz. of a 50 per cent. emulsion in sufficient water to get a good cover over the leaves.

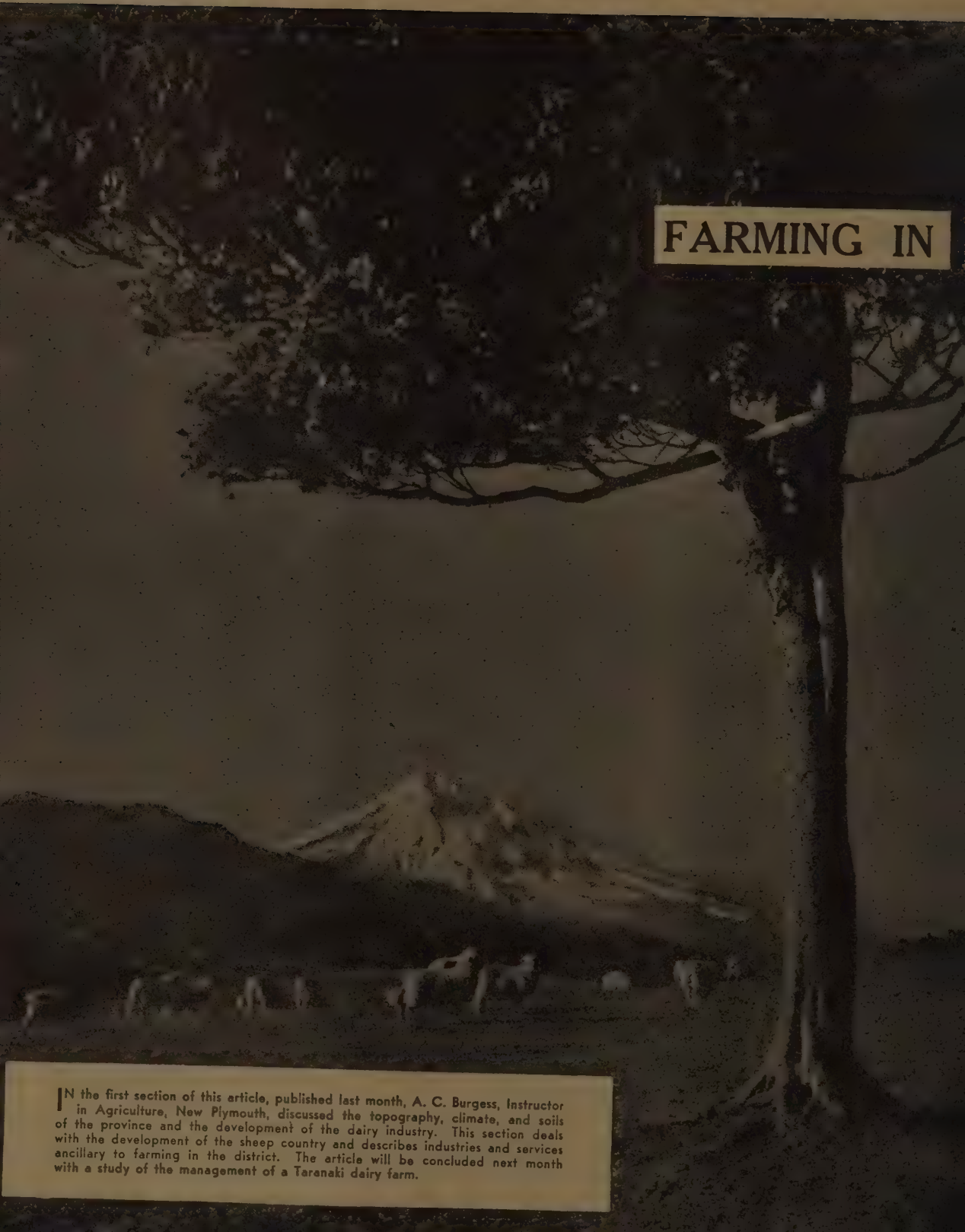
Care should be taken that there is no drift of spray on to neighbouring beehives.

DANGER

It must be remembered that lindane and "Metasystox" are both poisons. "Metasystox" can be absorbed through the skin and strict precautions must be taken by those working with it. These include protective clothing, including rubber gloves and masks; no eating or smoking during operations; removal of clothing if it becomes wet and immediately after completion of the job; and thorough washing or preferably a shower before eating or smoking. If poisoning is suspected, a doctor must be called immediately.

—C. P. WHATMAN

FARMING IN



IN the first section of this article, published last month, A. C. Burgess, Instructor in Agriculture, New Plymouth, discussed the topography, climate, and soils of the province and the development of the dairy industry. This section deals with the development of the sheep country and describes industries and services ancillary to farming in the district. The article will be concluded next month with a study of the management of a Taranaki dairy farm.

NEW ZEALAND: *The Taranaki District*

THE development of the hilly country to the east of the Taranaki "plain" did not begin until about 1895 and its progress was slower and the difficulties of settlement were many.

The early surveyors of this vast, very broken, densely bush covered area followed the old Maori tracks which had been used for perhaps 400 to 500 years.

Describing these tracks the "History of Whangamomona County", published by the Whangamomona Centennial Celebrations Committee in 1940, says:

> The most northerly of these [tracks] was that leaving the coast, a mile or two north of the White Cliffs, and known as the Tihi-Manuka track. This ran in a general . . . easterly direction from the coast, along the forest ranges and watershed of the Tongaporutu-Mimi and Waitara Rivers, crossing the Tangarakau River near the gorge . . . coming out on the Wanganui River at Koiro . . .
>
> About 1882-84 this route was reopened by Government surveyors and largely used by them for swagging gear and food into their camps . . .

Another track ran from Urenui to Tikorangi and Tarata, following what is now the Junction Road to Purangi, thence to Matau and east to the Wanganui River.

The first surveys in the country east of Stratford began about 1888, but it was not until 1892 that the town of Toko was formed with a store, a blacksmith's forge, and a hotel. By 1895 the East Road had reached Pohokura and 3 years later it was taken over a difficult saddle into the Whangamomona township, where in 1895 the first ballot for sections had been held.

Settlement of Whangamomona

The Whangamomona area was subdivided and settled originally under the Whangamomona Improved Farm Settlement, sections being given to men with limited capital with the twofold purpose of having their sections felled and cleared and bush cleared for formation of roads. Settlement thus preceded road access and settlers had to get in to their holdings by means of bridle tracks through dense bush. The settlement of other areas in the district followed a similar course.

In the early years of settlement settlers were unable to get sufficient stock to farm their land properly. Of the first year's progress of the Whangamomona Improved Farm Settlement the Annual Report of the Department of Lands and Survey for 1895-96 states:

> . . . 948 acres felled in 1895 and is now being grassed. None of the selectors have as yet erected houses, but some are preparing to build. No stock has as yet been taken on to the land, and the settlers, being all poor men, will have a difficulty in providing stock for their clearing.

In the next year's Annual Report it stated that:

> . . . 64 houses have been built, valued at £1,370 . . . a large number—over 300 head—of stock is now running on the settlement, a fair proportion being cows.

The Aotuhia settlement to the east of Whangamomona township lies in an area where difficulties have probably been greater than in any other part of the Taranaki back country and where large areas were later abandoned.

Some interesting sidelights on the difficulties of the earlier settlers in Aotuhia are given in the "History of the Whangamomona County":

> Aotuhia is one of the early settlements in the Whangamomona County. It is situated about 13 miles east of Whangamomona township, and near the Wanganui River. The topography is high, broken, steep hills, narrow valleys, with streams flowing through deep gorges; blue papa and sandstone formation, originally densely covered with bush, the timber varieties indicating that the land would develop into good grazing country when cleared and farmed.
>
> The first settlers arrived in this locality between 30 and 40 years ago [1900 to 1910]. . . . Most of these came in by way of the Wanganui River, this stream being their only means of transport and communication for some years. A 6 ft. track for about 5 miles was formed through the bush along one of the valleys from the settlement to the river . . . wool, butter, skins, and hides were packed out on horses over this track and all stores and farm requirements were brought up by river boat and packed over the same route. . . .
>
> The greater length [of the track] was cut out of steep hillside, here and there across the face of a papa bluff. . . . The constant plodding of loaded horses over such terrain, together with the heavy rainfall of the locality, aided by the shade of dense bush, soon made the track . . . into a semi-permanent quagmire. . . .
>
> Sometimes a horse would take fright, perhaps at the crash of a falling tree, and bolt, and likely stampede the rest of the pack train, perhaps a dozen horses . . . flour, sugar, rice and such commodities would be mixed and irretrievably lost in the mud of the trail . . .
>
> These things were considered as minor troubles by the settlers. What caused them greater worry over their transport was the erratic timetable of the [river] service and the inefficiency in their landing facilities.
>
> When the formation of the Whangamomona road got under way transport was diverted in this direction. Packing still had to be done to the nearest place along the road to where wagons could be taken . . .
>
> The first sheep brought into the settlement were shipped up on the deck of one of the river boats [on the Wanganui River] and driven in from the landing.
>
> When sufficient bush was cleared off sections to build a house settlers began to marry and rear families. . . . As families developed the matter of education . . . became a problem . . . A school . . . was opened at Aotuhia with a roll of about 20 children, but the venture did not prove a success, and was abandoned.
>
> . . . children had to be sent out to boarding schools for their education.
>
> While the prosperous post-war period continued all was well. The farms were yielding good returns . . . Later the depression came, farms no longer yielded sufficient for the proper maintenance of land and stock, and deterioration of pastures gradually commenced, with consequent lowering of carrying capacity, and settlers with families could no longer afford to send their children away from home to attend school, and one by one they were forced to leave their farms and find homes elsewhere from which their children could attend schools.
>
> The Great War also had its effect on the abandonment. The young men of the older families, who should and would have carried on from where their fathers left off, did not return to the task.
>
> Today [1940] the settlement is practically abandoned, with fern and manuka in sole possession of a very large area of what was once a productive and prosperous settlement . . . Most of it now appears to the uninitiated impossible country for farming, but it is the opinion of some of those who know this country intimately that with present transport facilities and with the right type of settler in occupation for 10-15 years, free of rents and land mortgage for that period, the land could and would be brought back to its former standard of production and probably surpass it.

Difficulties of Access

Access has been the main problem in the area. The "History of Wangamomona County" comments:

> In 1902 the late Rt. Hon. R. J. Seddon, then Prime Minister, speaking at Toko, said that the East Road would be metalled through the Tangarakau Gorge in 10 years. Now, after nearly 40 years, it is hoped it will be actually completed this year [1940].
>
> Hopes ran high in March 1901, when the first sod of the Stratford-Main Trunk railway was turned by the late Sir Wm. Hall Jones, then Minister of Public Works, at Stratford, the Minister telling his large audience that the line would be connected with the Main Trunk at Ohahakura . . . the last spike being driven home at Heao . . . in 1932. . . .
>
> If the roading had been carried out ahead of settlement, a very different history of the county could have been written now. Instead, settlers had to find their way to their sections as best they could. For years, with the exception of the Main Road, there were only 6 ft. tracks, blocked by slips and logs in the winter. . . . Wool could be sledged out only a bale at a time even on the Main Road.

This is the story of all the Taranaki back country, a story of hardship, with little help from the Government of the day.

A prominent settler from the Kohuratahi district has summed up other difficulties of the early settlers as follows:

> Lack of experience and lack of capital handicapped the settlers and taking into consideration the hilly nature of the land, the sections were too small, the main road land having been cut into 100-acre sections.

Reversion to Secondary Growth

There have been other reasons, too, for this country having suffered setbacks in its development. Sir Bruce Levy, the former Director of the Grasslands Division of the Department of Scientific and Industrial Research, writing in the "Journal of Agriculture" in 1923 and 1924, discusses the Taranaki back country at length. He describes Nature's incessant struggle to win back the country to forest and points out how under different stocking conditions areas tend to revert

Photograph opposite by Wilkinson.

A covering of volcanic soil is common on tops of much of the hill country in North and Central Taranaki. After first cultivation with giant discs drawn by a crawler tractor a wheeled tractor can be used for further cultivation.

through weeds, fern, and scrub to forest.

In the "Journal" of May 1924 he writes:

Of the Taranaki back country in general it may be said that there is a very much larger area on the hills covered by secondary growth than by grass. Along the easy sloping foothills there is usually good grass, but as one ascends the hills the grass turf weakens . . . In a stocked area on such a slope the first zone of secondary growth is usually hard fern dominant, and manuka may be sprinkled among this. Above the hard-fern zone bracken usually predominates until one reaches the ridges, where usually, on the stock trails and camps, there is a good sward of grass. . . .

Pastures having from 30 per cent to 90 per cent of the sown area covered by hard fern are not uncommon, and, as a rule, with the turf of grass constituted as at present, the hard fern is on the increase. Manuka, again, is spreading, and this spread is due almost entirely to the open nature of the pasture sward. The foregoing applies to the areas poorly farmed. On the better-farmed portions there may be as little as 10 per cent of secondary growth, some paddocks being virtually clean, but even among the best farmers of the district it is not too much to say that an average of 30 per cent of the farm is growing nothing but hard fern, manuka, or other rubbish. . . .

Nearly all the common grasses and clovers met with in pastures generally can be found in the Taranaki back country at the present time in greater or smaller amount, but a great many of these have been introduced slowly and only during the past few years. In the early days of felling and sowing this country little else but ryegrass, cocksfoot, and red and white clover were used. Later sowings included some of the other better grasses such as timothy, crested dogstail, meadow foxtail, *Poa trivialis*, and *Poa pratensis*; and a sprinkling of these even might have been sown on the very early burns. It is only recently that the farmers of the district have appreciated the need of introducing the second-class grasses—browntop, *Danthonia pilosa*, etc.; but even yet many still pin their faith to the better English grasses such as cocksfoot and ryegrass. . . . In his [the writer's] opinion it is largely the lack of the finer close-turf-forming grasses that has led to so much going back of the country to secondary growth.

For the present-day [1924] farmer who does not include the finer grasses in his mixture one can have little sympathy; but the pioneer settlers of the Taranaki back country cannot in any way be blamed for their omission, for certainly the great forest growth and the remarkable early productivity of the hill pastures gave indication and promise of a wonderful fertility, so that it appeared then almost criminal even to suggest the poorer, second-class, finer grasses in view of the so prolific growth of the better English species. The wonderful growth of the clovers also led further to the belief that the Taranaki back country was eminently suited to the first-class grasses and clovers. The writer claims that this country is still good potential grassland, though the farmer must needs come to realise that the finer, second-class grasses and clovers must be included to take up the running as the better grasses and clovers weaken and go out.

Pasture Improvement on Hill Country

On much of the hill country in the central and northern parts of the district there is a proportion of easy, flat to rolling "terrace" country covered with volcanic soil, together with the steeper papa and sandstone hills. This terrace country provides the valuable cropping area.

The land for cropping is generally giant disced and worked up with discs and harrows and a crop of swedes or chou moellier grown. Swedes are usually the most satisfactory crop. After the crop the land is left fallow until autumn, when it is worked and sown in grass. Generally the ground is consolidated with a mob of ewes before the seed is sown.

← The first stage in the development of a North Taranaki hill-country farm. From the Alexander Turnbull Library photographic collection.

A grass seed mixture suitable for this country is:

	lb.
Certified perennial ryegrass ..	25
Certified short-rotation ryegrass	5
Certified cocksfoot	4
Certified white clover	2
Certified cowgrass	2
	38

Four to 5 cwt. of superphosphate per acre is sown with the seed, and annual topdressing should include an occasional application of potash.

The steeper papa and sandstone hills carry a fairly good pasture if the country is well managed. The first essential is adequate fencing to ensure proper control. Fencing along ridges is common on the steeper country, though sometimes short lengths of fencing at the head of a gorge are all that is required.

Fences round the "terrace" country are necessary to separate it from the steep gully faces below. These steep faces are generally likely to slip to some extent and they grow very heavy hard fern. The only way to control this hard fern is to stock heavily with cattle, especially during late autumn, but at all times to give long spells between grazing to allow the grasses and clovers to grow strongly. Such management is impossible if the steep country is not adequately fenced.

Burning hard fern should not be a regular practice, but often good burns can be made in spring and sometimes in autumn and if the burns can be oversown and the pasture well managed afterward, it is a help in the control of hard fern.

Scrub Land

Manuka scrub covers large areas of hill country in all parts of Taranaki. Where it has been in scrub for years it grows up to 20 or 30 ft. high. Though manuka blight is prevalent all over the district, it has not yet killed out many areas. This is probably due to the high rainfall.

Scrub cutting is generally done by contract, prices varying from £4 to £7 per acre. After the scrub is burnt in early autumn a good strike of grass is generally obtained. The seed is sown on the ash as soon after burning as possible. A mixture which is commonly used is:

	lb.
Certified perennial ryegrass	12
Certified short-rotation ryegrass	4
Certified cocksfoot	3
Crested dogstail	2
Certified white clover ..	2
Lotus uliginosus (major) ..	½
	23½

Browntop and chewings fescue are now not often included in mixtures even on steep, oversown country, because they usually come in on their own after the scrub is burnt. There is no doubt, however, that both of these grasses, especially browntop, still have an important place in our steep hill-country pastures.

Topdressing

Topdressing had not played a great part in the development of Taranaki hill country until recent years, when higher prices for wool have given a big boost to the practice. Even where topdressing by hand has been possible, labour shortage and high wages have tended largely to limit the amount of fertiliser applied that way.

With the introduction of aerial topdressing the face of the Taranaki hill country is rapidly changing. The cost of fertiliser applied on most Taranaki

A Taranaki hill-country farm → about 1900. From the Alexander Turnbull Library photographic collection.

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hill farms is about £17 per ton or about 34s. per acre when applied at 2 cwt. per acre. On the basis of present prices for produce this practice is economic.

Sheep Breeds and Crosses

In the early days of settlement only cattle were run, mainly Shorthorn cattle, which were bred and sold to the farmers on the easy country for fattening. Later beef breeds were introduced and Polled Angus and Herefords became the most popular breeds. Today the Polled Angus is the predominant breed, though many Hereford and Hereford-cross cattle are still used.

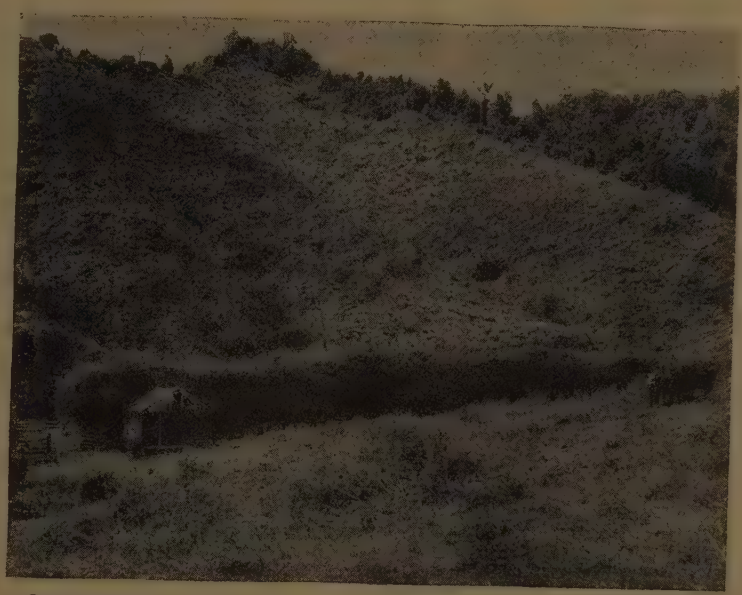
Even Jersey and Jersey crossbred cattle have been used to quite a considerable extent at times. Sound empty cows, run with the bull and sold when in calf, have proved quite a profitable sideline for many farmers, especially on the easier country. Many again have bought weaner calves, kept them and mated them, and sold them as in-calf 2- or 3-year-old heifers. Though the running of these classes of stock has been quite profitable, especially when wool prices were low, the stock are not suitable for the work they are required to do and the country has suffered in consequence.

The raising of Jersey heifers has still an important place on sheep farms on the richer fattening country, however, where the calves do particularly well if well managed and command a hign price when sold back to the dairy farmer as in-calf heifers. Large numbers of in-calf heifers not required in Taranaki are bought by dairymen in Waikato and the demand for them is keen.

The Lincoln was the popular sheep breed in the early settlement period of this hill country. Its main attribute was the heavy fleece and also the fact that, on country where there was much timber about, the wool was not dragged off the neck and belly as with other breeds. However, Lincolns are more suited to heavy, rich land and soon great difficulty was experienced in rearing the sheep past the hogget stage. The Lincoln also was not a good forager on the steep hills and it was gradually replaced by the Romney.

The outstanding changes in sheep farming in Taranaki in the past 30 years have been the replacement of Lincoln-cross sheep by Romney-cross on all the steeper country and the development of the fat-lamb industry, in which the Romney-cross ewe and the Southdown ram have been used, on the easier hill country. Four- and 5-year-old Romney-cross ewes bought from the farmers on the steeper hill

Access to some of the back areas of hill-country farms in Taranaki is poor and tracks have to be constructed by farmers. The maintenance of these tracks is sometimes costly.



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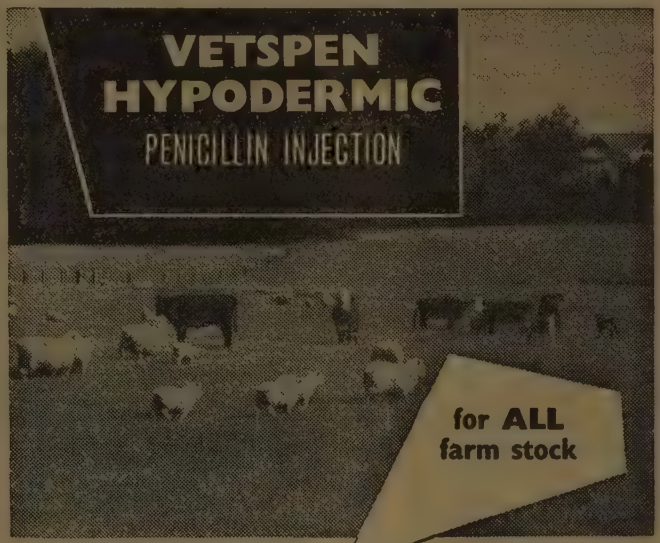

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country are mainly used for fat-lamb raising, though some farmers breed their own replacement ewes, and ewes from 2-tooth upward are crossed with Southdown rams. On the volcanic country where sheep are run ewes are often kept until 7 or 8 years old for fat-lamb breeding.

Today about 680,000 fat lambs are killed annually at the freezing works at Waitara and Patea.

Dairying as a Sideline

An important sideline to sheep farming on much of the Taranaki back country has been dairy farming in a small way on the rich river flats which are common in all parts of the country. Herds of 20 to 40 cows have been sufficient to bring in a steady income large enough to keep the average family quite well even when wool prices were very low. However, the effect of running cows has been to limit the area available for beef cattle, with the result that the steeper country gradually deteriorated and was abandoned. There are many farms where the area in use has become smaller and smaller until only the flats carrying the dairy cattle could be farmed and the hills became covered in fern and scrub.

Sideline dairying has had an important place in the farming of this country, but it has not been really beneficial.

Terraces above a steep ridge being developed preparatory to sowing to pasture.

Easier country on the top of steep, difficult country sown to grass and now carrying considerable numbers of stock.

TARANAKI TODAY

Communications

A good system of communications is essential to support farming and allied industries on the scale to which these are developed in Taranaki, and good communications have played a big part in the building up of thriving industries in the district.

The story of the early settlers in Taranaki, as in most other North Island farming districts, has been one of hardship resulting from poor communications with the outside world, and the inadequate facilities provided for the disposal of their produce and for the bringing up of their families.

Today the position is very different. Road, rail, and sea communications are all well developed and there is a daily air passenger service from Auckland and Wellington to New Plymouth. Road transport services from the main centres to all parts of the district are regular and frequent, and the farmers' trading organisations have built up an efficient service covering the whole of the area.

Roads

Present-day motorists driving through Taranaki can drive from the southern end of the district near Patea to the northern end at Awakino, following the coast most of the way, on a bitumen road. Alternatively they

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may strike inland at Hawera and travel via Eltham, Stratford, and Inglewood on the inland side of Mt. Egmont, joining the coast road again at New Plymouth or near Waitara, 7 miles north of New Plymouth.

Main roads joining Taranaki with other parts of the North Island branch off at Stratford, where the road runs east through Toko, Douglas, Whangamomona, and Ohura to Taumarunui, and at Ahititi, 40 miles north of New Plymouth, where the road again runs east to join the Stratford-Taumarunui road at Ohura.

Around Mt. Egmont there is a network of roads running from the bush line down to the main roads and running parallel to the streams. As the district is relatively narrow, especially in the north, the secondary roads are not as extensive as in many districts and are generally of good quality.

Taranaki roads were among the first to be paved with bitumen, the work being carried out mainly by the county councils.

Railways

A railway from New Plymouth runs through Inglewood, Stratford, Eltham, Hawera, and Patea on to Wanganui, Palmerston North, and Wellington. A short branch joining this main line at Lepperton brings produce from Waitara and the northern part of the district.

At Stratford a branch line connects the province with the Wellington-Auckland main trunk line near Taumarunui, and a branch line joins Opunake with the main line near Hawera. There is a regular passenger and freight service from Taranaki to Wellington and Auckland.

The Port of New Plymouth

The development of a good deep-sea port at New Plymouth has been of major importance to the farming industry in Taranaki.

When F. A. Carrington landed near the present site of New Plymouth in 1840 his first observation was that one of the main limitations to the development of Taranaki as a farming district was the lack of a suitable port. He considered, however, that it would be possible to establish a successful port if a breakwater were constructed. This was the course adopted many years later.

New Plymouth was originally an open roadstead, but the development of the district forced on the inhabitants the necessity of providing better facilities for the shipping of their produce.

The construction of the breakwater was started in 1881 and continued with occasional breaks until 1906, when the mole had reached a length of 2,194 ft. At present the mole is just over 3,500 ft.

In 1905, when the port was capable of accommodating vessels of 1,000 tons, 500 vessels entered and left it, and the total volume of trade was 62,508 tons. Butter and cheese exported in 1905 amounted to 86,904 cwt. and was valued at £389,813.

The port can now accommodate ships up to 15,000 tons, and the annual trade now exceeds 430,000 tons, with imports of about 330,000 tons and exports of about 100,000 tons. New Plymouth is now the largest cheese-exporting port in New Zealand. In 1956 the amount of cheese exported was 32,706 tons and that of butter exported was 14,934 tons.

The value of the port to the farmers of Taranaki is difficult to estimate. Fertiliser and petrol are two major items that if they had to be railed from another port might easily cost the province £500,000 more each year.

Considerable improvements have recently been made at the port of New Plymouth which help considerably to speed the turn-round of ships, thus in turn reducing shipping freights. A new wharf has recently been built and it will enable more shipping to be handled. The use of motor transport

Cattle on sown pasture on the coastal area of North Taranaki.

Scrub-covered, coastal hill country near Awakino, which carries few stock.

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to unload phosphate and potash and transport them to the fertiliser works about 4 miles away has considerably reduced the length of stay of phosphate ships at the port.

Another important improvement has been the installation of facilities for ships to refuel with bunker oil while in port. Previously the ships on the phosphate run from Nauru to New Plymouth would unload their cargo there and then sail to Wellington to refuel before returning to Nauru to reload.

Over three-quarters of the trade handled at the port is done for farmers and there is no doubt that the better organised are the port facilities and the more trade that can be handled at New Plymouth the less will be the handling costs of the trade of the port. It is therefore in the interests of farmers of the province that there should be a well developed and suitable port in Taranaki capable of handling all their produce.

The port of Patea has been important in the past in the handling of frozen meat and cheese produced in the southern part of the province, but as it is a river port with a bar at the entrance, trade is confined mainly to small coastal ships.

Ancillary Industries

Taranaki is well provided with facilities for handling the produce of the land and with organisations closely linked with farming.

Freezing Works

At Waitara, north of New Plymouth, and at Patea, south of Hawera, there are large freezing works handling beef, mutton, lamb, pork, and bacon. These with two smaller bacon factories at Hawera and Eltham handle in a year about 80,000 beef carcasses, 208,000 calves, 268,000 sheep and 680,000 lambs, and 83,000 pigs.

Dairy Factories

There are 104 cooperative dairy factories producing annually 55,000 tons of cheese and 15,000 tons of butter. By-products of the dairy industry are handled at Kapanui, where a factory converts whey into sugar of milk, a product with a world-wide market for use in baby foods and in the manufacture of penicillin. In another factory at Eltham bobby calf vells are used to extract rennin, from which rennet is made and sold all over the world.

Fertiliser Works

The fertility of the Taranaki farm lands is very dependent on regular supplies of phosphate and potash. Some of the phosphate used in the district is imported, but most of it is superphosphate manufactured at the works at Smart Road, near New Plymouth. There about 120,000 tons of superphosphate is manufactured annually. Before distribution it is mixed with serpentine rock or a mixture of serpentine and ground rock phosphate.

Rock phosphate is shipped to New Plymouth from Nauru, Ocean Island, or Makatea Island, serpentine rock is railed from Te Kuiti, and sulphur is shipped from the United States of America. Fertiliser from this works is used all over Taranaki.

Hill country on the upper reaches of the Patea River, the development of which is hindered by poor access.

Chemical Manufacture for Agriculture

One of the most important advances in farming in post-war years has been the use of chemicals known as plant hormones as growth regulators and weedkillers. A New Plymouth firm was a pioneer in this field and now manufactures a full range of weedkillers and fungicides and insecticides which are used not only in Taranaki but in other parts of New Zealand.

Aerial Topdressing

The use of the aeroplane for applying superphosphate to the steep and inaccessible hill country of New Zealand is an industry which has grown considerably in the last 9 years, and Taranaki's hill country has benefited from this innovation as much as that of other districts. In 1949 a company was formed in New Plymouth to carry out aerial topdressing in the back country of Taranaki.

By March 1951 this company had spread 6,000 tons of superphosphate and by January 1957 the quantity had reached 140,000 tons. However, the spraying of noxious weeds, seeding, and the dropping of fencing materials and of winter fodder are now becoming an increasing percentage of the total annual work.

Two smaller companies based on New Plymouth also operate in Taranaki and with a very good coverage of airstrips farmers are well served with facilities to apply their fertiliser. Many dairy farmers are now having their farms topdressed aerially.

All round Mt. Egmont there are farms which are very broken by gullies having faces too steep to allow a machine of any kind on them. On these farms aerial topdressing is solving a big problem, though the cost of application is high.

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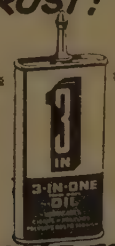

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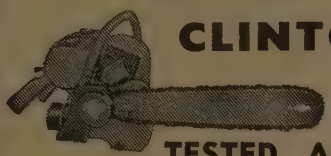

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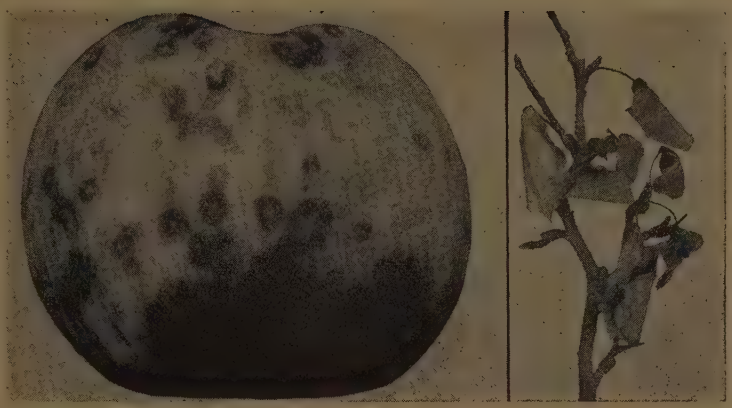
By D. W. McCALLUM,
Horticultural Instructor, Department of Agriculture, Blenheim

OF the various insects which attack fruit trees few are as insidious in their action as the group known as scales, particularly in home or farm orchards, where a detailed spray programme such as is carried out by a commercial orchardist is not generally practicable. This article briefly describes the scale family, including the more important ones on fruit trees, and briefly discusses control measures. Reminders are also given for routine winter work in the orchard which, when properly done, goes a long way toward ensuring a clean crop of fruit the following summer.



San Jose scale on apple fruit and twig. Leaves on severely affected twigs wither but do not fall until well into winter.

SCALE insects are one of the most peculiar of all insects; not only is there a great variety of different forms within the family, but the sexes in the same species differ remarkably. The female scale is better known and more often met with than the male, and when mature bears little resemblance to an ordinary insect.

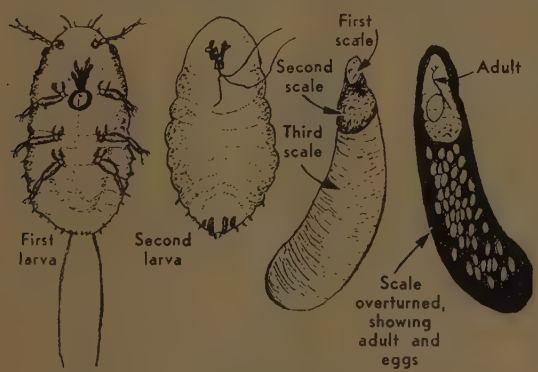
When hatched from the egg the young scale is quite active and wanders over the plant until it finds a suitable position, where it settles down and begins to feed by inserting its needle-like, piercing mouth parts into the plant tissue and sucking the sap. At this stage the scale's body gradually becomes covered with a waxy secretion.

The female then develops quite differently from the male. Most females lose their legs and feelers and remain fixed to the same spot for the rest of their lives. Their bodies become covered and protected by a powdery wax or white, waxy filaments, or by round, oval, or elongated, shell-like scales. In this position they continue to drain the sap and, when mature, to produce large numbers of eggs which are protected by the bodies of the females and the scale-like coverings until the young hatch and begin to wander over the plant.

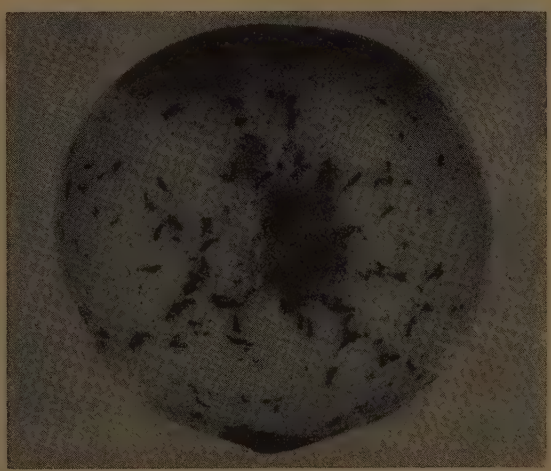
Cause of Plant Damage

The piercing of the plant tissue and the sucking of the sap by innumerable individuals, with the toxic action of the saliva injected into the plant during feeding, cause the main damage. Scales multiply very rapidly, and it has been said that under ideal conditions one female San Jose scale can have over 30,000,000 descendants in a year.

With some scales, particularly those attacking citrus, the first obvious sign of infestation is the presence of the unsightly, black, sooty mould fungus which grows on a sticky material excreted by the scale, and commonly called honey dew. Spraying to control the scale will also control the fungus, which will die when there is no honey dew on which to grow.



Stages in the development of the female mussel scale.



A severe attack of mussel scale on a Ballarat apple.

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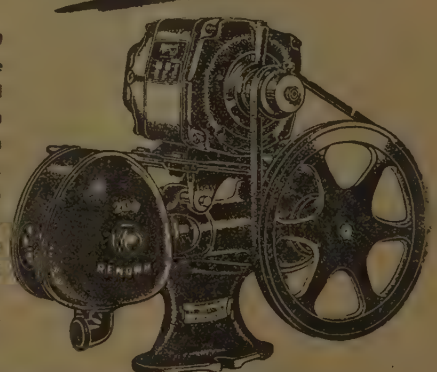

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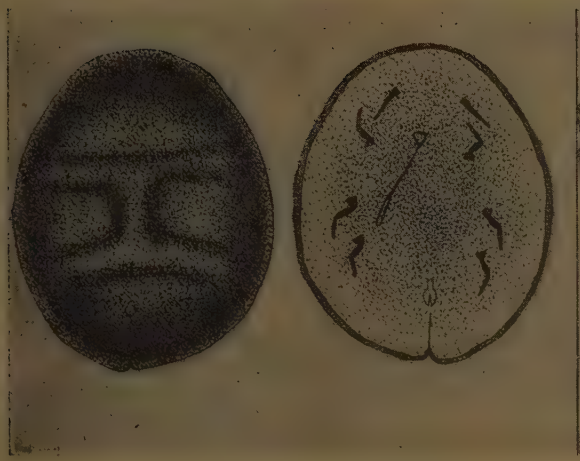
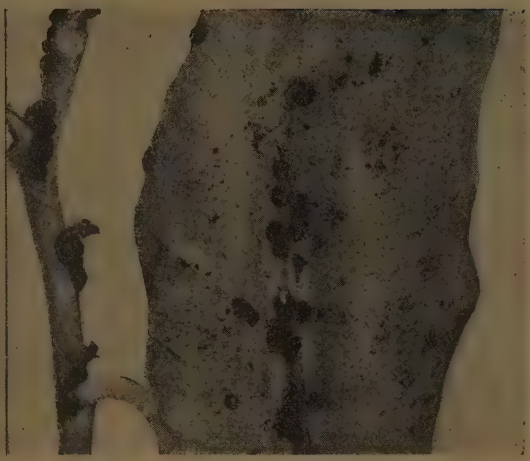


Olive scale, showing the characteristic H mark on top of the scale and the sucking mouth parts (right).



Olive scale on twig and foliage of citrus.

Scale Species

There are many scale insects which attack and can seriously affect fruit trees. The following are most general in their distribution in New Zealand.

San Jose scale (*Quadraspidiotus perniciosus*) is a serious pest of all deciduous fruit trees. On the wood of infested trees the scale often completely covers the bark, forming a crust, and unthriftiness or death of the wood follows. On the fruit characteristic reddish blemishes are caused. Frequently, affected trees carry their dead leaves well into winter. The life history of San Jose scale differs from that of other scales in that there is no egg stage. The young scale is born alive and there are several generations in a year. Distribution is by wind, birds, and insects which visit infested trees.

Mussel scale (*Lepidosaphes ulmi*) is elongated, dark brown, and shaped rather like a mussel. The scales can form a thick encrustation on the bark and also establish themselves around the stem end of the fruit in severe infestations. Apples, pears, gooseberries, and currants are all attacked, but the main host is the apple. In New Zealand there is only one generation in a year and the scale overwinters in the egg stage.

Olive or black scale (*Saissetia oleae*) can be particularly destructive on citrus. It is nearly hemispherical and measures from ⅛ in. to 1/5 in. in diameter. There is an H-shaped mark on the back of the brown or black body. A copious supply of honey dew is excreted by the olive scale, and both foliage and fruit may be disfigured by the sooty mould which grows on this. The scale overwinters in all stages and it is generally thought that there is only one generation a year.

Hard wax scale (*Ceroplastes sinensis*) is mainly a pest of citrus, but it can also check the growth of feijoas and tree tomatoes. The insect is cone shaped, rather pinkish when young, and white or greyish when mature. The very young forms have eight white waxy protruberances around the edge and one in the centre, giving a star-shaped appearance. Eggs of the one generation a year are laid in summer and the scale develops throughout winter. Sooty mould grows on the honey dew excreted and the fruit and foliage are disfigured.

Control of Scale Insects

Emulsified spraying oils and lime sulphur are most commonly used against scales. On deciduous fruit trees, such as the apple and pear, a 5 per cent. (2 pints to 4 gallons of water) red spraying oil applied when the tree is completely dormant will give good control. Where the infestation is particularly severe a 1 : 15 (2 pints to 4 gallons of water) lime sulphur application a few days before the oil spray is applied will soften the protective coating of the scale and make it more susceptible to the oil.

On citrus and other evergreen plants white oil is used. This is a more refined type of oil than red oil and is quite safe to use on trees in full foliage at the strengths recommended. In February a spray of 3 per cent. white

Hard wax scale. Young scales in the "star" stage (left) and adults feeding on citrus (right).

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oil (1 pint 4 fl. oz. to 4 gallons of water) should give good control of scales. However, if infestation is severe, it may be necessary to repeat this spray 2 or 3 weeks later. To control hard wax scale trees should be sprayed during May with 1½ per cent. summer oil (12 fl. oz. to 4 gallons of water). For further information on the control of citrus pests and diseases see Department of Agriculture Bulletin No. 20, "Citrus Pests and Diseases in New Zealand", obtainable at offices of the Department.

Routine Work

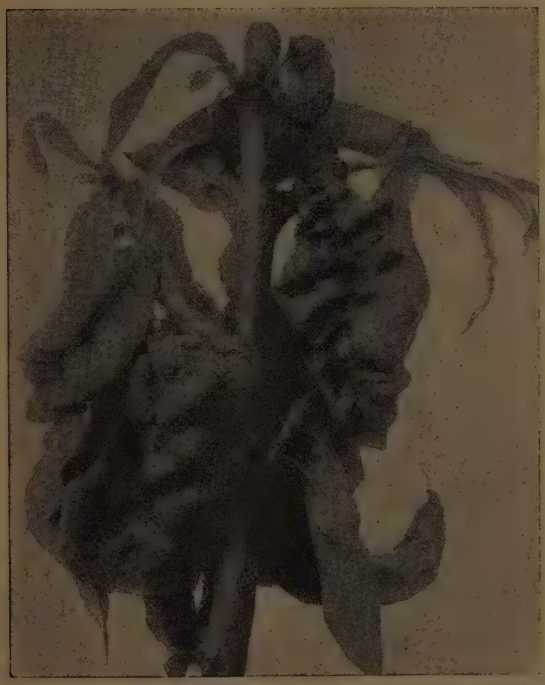
Winter is pruning time. Many books and articles have been written on this subject, but the whole object of pruning may be summed up quite briefly: Pruning of all types of fruit trees is done to ensure regular crops of good fruit. The argument is frequently put forward that trees left unpruned carry fruit, so why prune? Unpruned trees do crop, but the fruit is generally smaller and the trees are too dense to permit thorough spraying or satisfactory ripening.

Peaches and nectarines left unpruned soon tend to carry all their fruit at the tops of the leaders and the large amount of dead wood in neglected trees provides an entry for disease.

Fruits mummified through brown rot and twigs with brown rot cankers should be burnt, as they carry over the disease.

During pruning all mummified fruits should be removed, and if brown rot and leaf curl have been seen on stone fruit trees, a watch should be kept for the signs of these diseases on the wood. All pruning cuts larger than about an inch in diameter should be treated with one of the several compounds available. Prunings should be burnt.

Spray outfits should be checked over and parts renewed as required. Red and white oil spray materials should be on hand. Red oil is applied to deciduous trees in the dormant period. In addition to controlling the scale insects already mentioned the spray also kills woolly aphids, green and black aphids, and overwintering eggs of red spider mite. Thorough coverage of the trees is essential to provide control.



Leaf curl on peach foliage. Spraying at or before bud movement is essential to prevent this.

Apples and Pears

Apples and pears stored for winter use should be checked over periodically and any showing signs of breakdown used immediately. Cool, airy storage will always give the best results, and only sound fruit should be kept. When apples and pears are being pruned it should be remembered that they fruit on 2-year-old and older wood and on fruit spurs. The tendency for the past few years has been to encourage lateral bearing rather than spur bearing. The laterals are replaced every few years.

If new plantings are being planned, consideration should be given to the type of tree required. Dwarfing stocks are available for both apples and pears. Trees on these stocks have distinct advantages for home gardens. They are more compact in growth and consequently more easily maintained, and they begin cropping several years earlier than do trees on more vigorous stocks.

Dwarf trees do not bear as heavily as do the larger trees, but the closer planting that is possible means that approximately the same crop is harvested from a given area of ground. Trees on dwarfing stocks are also suitable for training as cordons or espaliers. Malling IX is the dwarfing stock for apples and Quince C for pears.

Peaches and Nectarines

On peach and nectarine trees small mummified fruits are frequently found still adhering to the branches. These should be removed as they carry over fungous diseases.

When peaches and nectarines are being pruned it should be remembered that they crop only on growth made the previous season. In addition to the removal of old wood which has fruited, potential fruiting wood should be thinned out by up to 50 per cent. to stimulate growth for future crops.

To reduce the risk of silver leaf infection large cuts are best avoided if possible. Where they are necessary a suitable wound dressing will give some protection. This dressing should be examined every few months to see if it requires renewing.

Leaf curl is an annual problem in many home orchards and seriously affects the vigour, health, and cropping capacity of the trees. Leaves, shoots, blossoms, and fruits are affected, but the most obvious symptoms are seen in the leaves, which are distorted and thickened.

Spraying will assist to prevent the disease, but the spray must be applied before the fungus gains entry. Bordeaux mixture (6½ oz. of copper sulphate and 5 oz. of hydrated lime to 4 gallons of water) applied at or before bud movement is quite effective.

Apricots, Plums, and Cherries

Young apricot, plum, and cherry trees require the same careful training as other types, but once they reach maturity the minimum only of pruning is necessary. If only dead and diseased wood and crossing branches are removed, regular cropping may be reasonably expected in districts suited to these fruits.

Most cherries and plums require cross pollination with a compatible variety for successful cropping. This aspect should be considered if trees 5 to 6 years old flower but fail to set a crop. The nearest office of the Horticulture Division will be able to supply information on suitable pollinators. Apricots are self fertile and do not require pollinators.

Citrus

As most citrus form well shaped trees with little or no training, the necessity for regular pruning is slight. Undesirable suckers or water shoots which arise from the base of the plant need removing, but otherwise pruning may be limited to the shortening back of unduly long growths and, of course, the removal of any dead or diseased wood. In districts subject to late frost pruning should be delayed until the danger of frost damage is over.

Raspberries

All old cane growth of raspberries should be cut off at ground level and the new canes which will fruit next season reduced in number where necessary. It is not possible to lay down hard-and-fast rules on how many canes to leave, as this depends on a variety of factors, but generally 12 canes per stool are ample if the canes are grown on the hill system, and four or five if on the hedge system.

Many of the feeding roots of raspberries are close to the soil surface, and though weed control is important, cultivation should never be more than a few inches deep.

Gooseberries

When varieties of gooseberries which have a weeping habit, such as Farmers Glory, are being pruned the risk of tip rooting may be reduced if cuts are made to an inward- or upward-pointing bud. Harvesting is much easier if the bush is kept open in the centre.

The diagram on page 467 is from "Garden Pests in New Zealand", by Dr David Miller, published by Whitcombe and Tombs Ltd., and the other illustrations, with the exception of the lower one on page 471, are reproductions of Department of Scientific and Industrial Research photographs.

"New Zealand: Inventory and Prospect"

THE 1956 programme of the Wellington Branch of the New Zealand Geographical Society comprised a series of seven lectures which dealt with the changes that have taken place in agriculture and industry in New Zealand over the past century and their effect on the rural and urban communities. The papers have now been brought together in a cyclostyled booklet published by the branch under the title "New Zealand: Inventory and Prospect".

It begins with a delightful paper by Professor Jobberns, of Canterbury University, which really takes the form of reminiscences over a period of 50 years, but which at the same time throws into relief some of the developments during the period that have changed our landscape. I. J. Pohlen, an officer of the Soil Bureau, describes adequately in a short space New Zealand soils and how they are used, and P. W. Smallfield, Assistant Director-General of Agriculture, gives an up-to-date description of our farming industry.

The development of secondary industries and their role in the New Zealand economy are dealt with by Dr W. B. Sutch and N. E. Dalmer, both of the Department of Industries and Commerce. These two papers represent a considerable amount of research and contain information on our secondary industries of which many New Zealanders are unaware. S. H. Franklin, of the Geography Department of Victoria University of Wellington, discusses the contrasting age structures of the urban and rural communities of the North Island and indicates some of the future administrative problems of our rapidly expanding urban areas.

The concluding paper is by Dr H. B. Low, of Massey Agricultural College, who sums up and tries to assess our economic future.

The Wellington Branch of the New Zealand Geographical Society is to be commended for publishing the papers.

—*R.H.S.*

Price: 7s. 6d., postage free, from the Geography Department, Victoria University of Wellington, Wellington.

New Bulletin on Citrus in the Home Garden

PERHAPS not the least of New Zealand's many natural advantages is that the popular and nutritious citrus fruits can be grown in home gardens over a large part of the North Island and some of them in many sheltered places in the South Island even as far south as Christchurch, states Bulletin No. 393, "Citrus in the Home Garden", which has recently been published by the Department of Agriculture.

The bulletin advises on varieties of lemons, grapefruit, sweet oranges, mandarins, and less well known citrus such as tangelos, limes, and kumquats. Other information covers choice of rootstocks, types of trees to buy, best planting methods, fertilisers, pruning, control of pests and diseases, harvesting, and storage. The sections on planting, fertilisers, and pruning are illustrated by diagrams.

The bulletin can be obtained free from all offices of the Department of Agriculture.

Subscription Renewals

Renewals of subscriptions to "The New Zealand Journal of Agriculture" should be paid to the nearest office of the Department of Agriculture. Subscribers can ensure continuity of delivery by paying their subscriptions as soon as possible after receiving their renewal notices and at least 1 month before the old subscription expires. When payment is made the renewal notice should accompany the subscription to ensure that the correct details are recorded.

History of Fruitgrowing in Canterbury

THOUGH the importance of fruitgrowing in Canterbury has always been overshadowed by the major farming pursuits of sheep raising and cropping, fruit production was one of the settlers' earliest ventures, and the quantity and range of fruit varieties now grown are quite extensive. This article by S. Frew, Assistant to the Horticultural Superintendent, Department of Agriculture, Christchurch, traces the history of fruitgrowing in Canterbury Province.

CANTERBURY PROVINCE, SHOWING FRUITGROWING AREAS, 1957

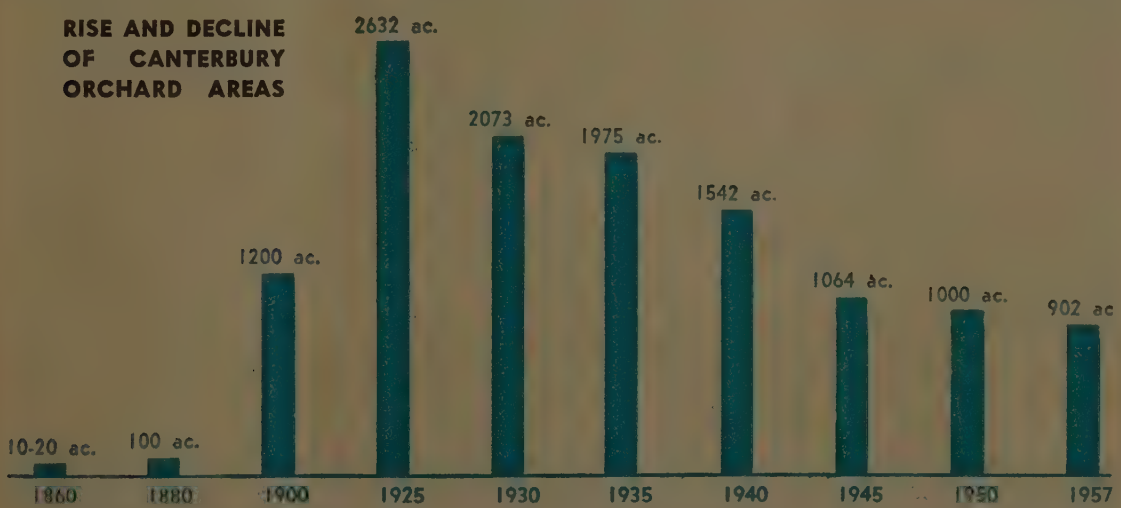
CANTERBURY PROVINCE, extending from Hurunui River in the north to the Waitaki River in the south, a distance of almost 200 miles, and from the east coast to the Southern Alps, a distance of some 80 miles at the widest point, naturally comprises a wide variety of soil types and climatic conditions. Not all of these are satisfactory for fruitgrowing; in fact, few places are ideally suited, and the development of fruitgrowing areas has in the main been due to a variety of commonsense factors: Proximity to market coupled with reasonably suitable soil, an adequate rainfall, and a degree of immunity from frost and other detrimental climatic conditions.

First Plantings: 1850-60

A natural desire for fresh-grown fruit induced the early settlers in Christchurch to plant fruit trees in Canterbury. The origin of these first trees is not known, but it may be assumed that some came from the fruitgrowing areas of England with first settlers in 1850 together with the other plants and seeds which were introduced at that time from the Homeland.

Australia may have been the source of many of these trees, as regular shipping between Australia and New Zealand became established early in the days of the new colony. Some trees might also have been received from the North Island, as an advertisement inserted by a Wellington nurseryman in the first issue of the "Lyttelton Times", dated 11 January 1851, offers "Fruit trees of the sorts found most suitable in the climate of the district of Wellington, or as experience may guide in the yet untried plains of the Middle Island". The advertisement further states that "the apple trees are warranted free from blight, a condition under which they cannot be procured from Hobart Town".

Whatever the source of supply, it has been definitely established that



From small beginnings orchard areas became extensive by 1900 and, greatly accelerated by the 1910-20 planting boom, plantings reached their peak by 1925. Since then there has been a steady decline in total area. Early reductions were due mainly to uneconomic units being pulled out, but later losses of area can be attributed to urban spread.

1850-70

within a few years of the founding of Canterbury Province in 1850, several small areas of plums and cherries were producing fruit for sale. One pip fruit orchard was in production within the first 10 years of the province's history.

After the lapse of over 100 years it is impossible to state definitely who was the first commercial pip fruitgrower in Canterbury, but from the evidence available, it appears that the distinction belonged to John Stanley of Harewood. Stanley, one of the original pioneers, arrived at Lyttelton in the Randolph, one of the "First Four Ships" in December 1850.

Within 3 years of his arrival Stanley had established himself on 30 acres at Harewood. In a letter written to relatives in England in 1860 he stated that the first of his apple plantings had borne fruit in the previous year and that he had completed the planting of a further 400 apple trees. He went on to say that he was receiving a ready sale for his fruit, the price being 1s. per pound.

Stanley was also a nurseryman and in one letter dated 1860 he stated that he had grafted 2,000 apples as well as a great number of cherries, plums, and peaches the previous year, the majority of which he had sold to Christchurch nurserymen. These locally raised trees no doubt provided the material and perhaps some of the incentive for the further extensive plantings which occurred so early in the history of the settlement.

Stanley's own orchard was gradually extended until it covered 33 acres, including several acres of cherries. Portions of the original plantings still exist and a block of 32 Sturmer trees on the property of Mr H. A. Clarke, who now occupies the original homestead, is still producing heavy crops. Stanley is reputed to have introduced the Sturmer variety to Canterbury.

The Sisson Family: 1855-

To have been actively engaged in fruitgrowing in the same district for the past 103 years must surely be a New Zealand record; yet this is the proud achievement of the Sisson family of Papanui. From small beginnings the Sisson orchards gradually expanded until by 1920 the family holdings included over 130 acres of orchards.

Though the spread of suburban Christchurch has since absorbed some of these orchard blocks, the family still retains a substantial proportion of their orchards in Papanui. The name Sisson has been synonymous with fruitgrowing in Canterbury for over a century, during which the family has been consistently in the forefront with the adoption and development of improved methods.

Francis Sisson, the pioneer member of the family, landed at Lyttelton in 1855 and soon afterward settled on 26 acres at Papanui, where he cleared the land and established a market garden and mixed orchard. He was the originator of the Lord Wolseley apple (reputed to be a cross between Irish Peach and Stone Pippin), later to be one of the main culinary varieties of Canterbury. His son, Frank Sisson, built the first privately owned cool store in New Zealand in 1910. This is still in operation, though major alterations have been made during this time.

Frank Sisson was the first New Zealand grower to use lead arsenate for codling moth control. He imported this chemical from U.S.A. in 1905.

Fred Sisson, of the third generation, took a prominent part in local fruit "politics" and was Canterbury representative on the New Zealand Fruitgrowers' Federation for many years. Several members of the fourth generation of Sissons are still planting out new orchards in their district.

These Sturmer apple trees planted by J. Stanley over 100 years ago are the only trees remaining of his original orchard. Average production from them is still 12 to 15 bushels per tree.

First Stone Fruit Orchard

Papanui and Harewood thus have the distinction of being the first areas to have pip fruit orchards, but Governors Bay on Lyttelton Harbour had the first true stone fruit orchard. Governors Bay and Allandale, at the head of Lyttelton Harbour, were settled shortly after the arrival of the "First Four Ships" in 1850.

In those early days most of the available land was used for the growing of vegetables for ships and for the people of the port of Lyttelton, but during the 1850s a 2-acre orchard was planted with stone fruit by a Mr Dyer. Dyers Pass, over which the road from Governors Bay to Christchurch runs, was named after him. In those early days the difficulty of transporting produce from Governors Bay to Christchurch restricted any great development in that area, however, for many years.

Early Orchards in Christchurch

In the early years fruit was grown in the central town area and the adjacent settlements of Woolston, Opawa, St. Albans, and Dallington. It is recorded that William Wilson, the first mayor of Christchurch, conducted a combined market garden and nursery at Bedford Row, which is now in the main commercial area of the city. It is probably more than a coincidence that the city produce

markets are in that vicinity. Wilson, known universally as "Cabbage" Wilson, also had an orchard at Woolston. Another early grower in the Woolston district was T. York, who had about 3 acres of mixed fruits.

In the town itself a 2-acre orchard of mixed pip and stone fruit was established before 1860 by T. Armstrong in a section fronting Colombo Street. Armstrong's Drapery Emporium on the corner of Armagh Street and Colombo Street now occupies part of this orchard area.

Many other small orchards must have been planted about this time, as records show that in 1880 there were over 100 acres in fruit production in the township, Woolston, and Opawa areas. However, with the spread of the city the land was gradually taken for housing and factories. Of the original substantial orchard area, only two small blocks at Woolston, totalling 5 acres, are still in production. Otherwise, with the exception of odd large pear trees seen occasionally in domestic gardens, no trace remains of these early plantings.

Early Berry Fruit Production

Berry fruits were also grown in the early days. F. Sisson of Papanui combined black currant production with his tree fruits. Several small areas of strawberries were also grown during this period, but any raspberry production was introduced much later.

The French at Akaroa

Reference to early fruitgrowing would not be complete without some mention of Akaroa, where French settlers first became established in 1840. Though tree fruits were not grown by them to any extent, they established vineyards to supply grapes for wine making, but with the passing of the original settlers, the vines became neglected and the industry went out of existence.

Walnut growing then became the major horticultural venture. Many groves were established by 1870 and there are today about 2,000 walnut trees, including some magnificent old trees still in production on Banks Peninsula.

Development of Heathcote-Horotane Area: 1875

The first important development after the original plantings in the environs of Christchurch and at Governors Bay was at Heathcote. This district, which forms part of the Port Hills, had become settled very early, mainly because from the time of the

1870-80

first immigrants until the Lyttelton tunnel was constructed the route followed by settlers arriving at the port of Lyttelton was over the hill at the head of the Heathcote Valley and along what was known as the Bridle Track to Ferrymead. From here a ferry service conveyed passengers up the river to the Christchurch settlement.

Heathcote Valley provided a staging halt on this journey and settlers soon began to live in its vicinity. In 1875 the first orchard was established there. It consisted of 6 acres of apricot trees planted by William Gimblett. After the successful establishment of this orchard others were planted nearby.

Plantings in Outlying Districts: 1870-80

As settlement in the province continued to spread, orchards were planted in the outlying districts. Ashburton, Cheviot, Hanmer Springs, Scargill, and Templeton all had their blocks, some quite extensive, though little evidence of many of them remains.

In South Canterbury, Timaru and Geraldine also participated in this orchard establishment. In Timaru the first commercial orchard was planted in 1872 by Edwin Butchers, who set out 15 acres of mixed fruits on his property near the outskirts of the township. Mr Butchers imported some of his first trees from Australia, but

Some of the first Lord Wolseley apple trees planted out by Francis Sisson (right) about 1859. They are still producing heavy crops.

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being an enthusiastic horticulturist, he subsequently raised his own seedling stocks, on which he budded a multitude of varieties of both pears and apples.

Butchers was probably the first orchardist in New Zealand to practise mulching. In the early days Timaru was a great wheat growing district and large quantities of wheat straw were available. With horse and dray Mr Butchers took full advantage of this opportunity, devoting at least 6 weeks each year to the spreading of a straw mulch over his orchard. The results were outstanding and, without cultivation, the trees throve and produced heavy crops.

Eventually the area of this orchard was increased to 28 acres. Now occupied by the third generation of the Butchers family, it is still renowned for the large number of varieties (over 30 varieties of apples and 17 varieties of pears) remaining in production.

Concurrent with this Timaru orchard development fruitgrowing was introduced to the Geraldine district when Mr John Chapman planted a 5-acre block in mixed fruits. This was followed by plantings in the Fairlie and Pleasant Point districts some years later.

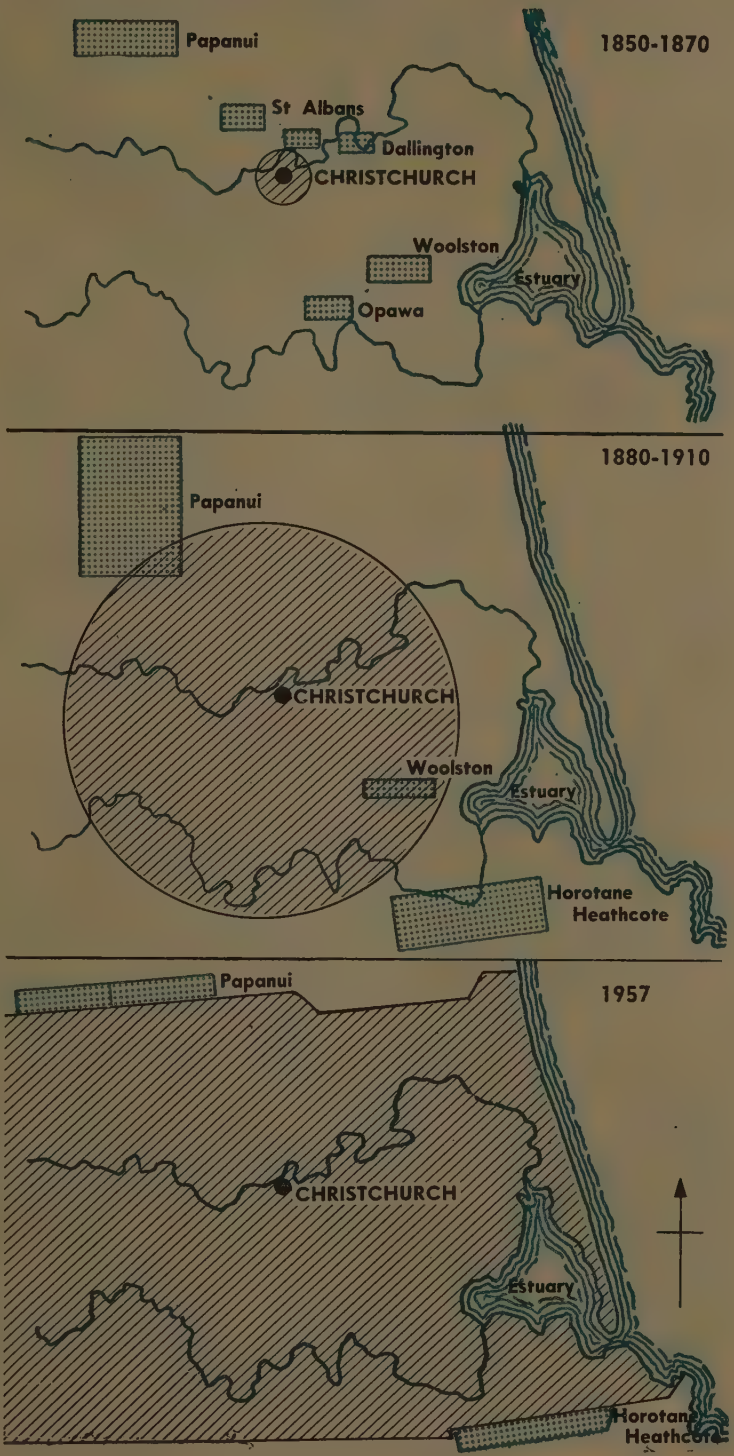
Though orchard areas continued to increase until by the early 1890s there were approximately 1,700 orchards within the North Canterbury and Mid-Canterbury areas, very few of these could be considered to be true commercial areas run by full-time orchardists. Over half of them were of less than 1 acre and only a few of the remainder were of a substantial size. Nevertheless, by this time there were sufficient growers primarily interested in the growing of fruit to warrant their aspiring to have their own properly constituted fruitgrowers' association, the first of its kind in the colony.

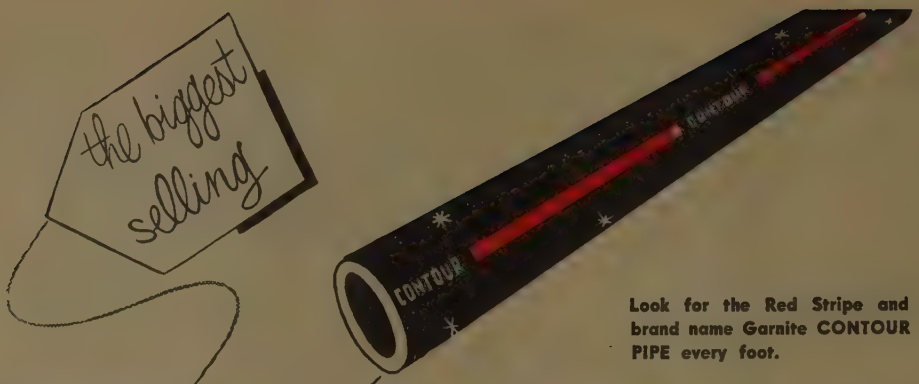
Canterbury Fruitgrowers' Association: 1886

The Canterbury Fruitgrowers' Association was formed in 1886. It was originally known as the N.Z. Fruitgrowers' Association, but as other fruitgrowers' organisations came into being in the colony the "N.Z." was dropped by the local association and "Canterbury" substituted.

Unfortunately much information about the early activities of this body was lost when a fire destroyed their original records and their minute books for the period 1886 to 1897. The Canterbury Fruitgrowers' Association from its inception was a very active body and strenuously endeavoured to cope with the numerous problems affecting the industry.

ORCHARD AREAS, ENVIRONS OF CHRISTCHURCH





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Early Growers' Problems

Serious problems were indeed already facing the industry when the fruitgrowers' association was formed. The early unrestrained planting of many areas, often too large for the owners' household needs and yet too small to warrant much time as a commercial proposition, resulted in the orchards generally being very neglected.

Disease was rife as no spraying was done, pruning was spasmodic or completely neglected, and in effect there was no fruitgrowing industry worthy of the name. A few comparatively large orchards were run on commercial lines in so far as they were the main occupation of the landowners, but most growers seemed apathetic toward reform.

Despite a duty of ½d. per pound on all imported pip and stone fruits, local markets were depressed and generally local produce could not compete with imported Australian fruit owing to its diseased condition and poor quality. While growers were requesting the Government to increase the duty on imported fruits they were doing little to improve the quality of their own produce. The whole of the crop of one of the largest orchards in Canterbury, for example, was used for the manufacture of cider, this being the most profitable means of disposing of the poor fruit generally produced.

Government Instructors: 1893

About this time the Government began to interest itself in the fruitgrowing industry and in 1893 two "Pomologists", as they were termed, were appointed, one for the North Island and one for the Middle Island (as the South Island was then called), with headquarters at Auckland and Christchurch respectively. J. C. Blackmore was appointed to the Christchurch district.

His "district" comprised the whole of the South Island with orchards as far apart as Takaka (Nelson) and Southland, including a thriving established stone fruit area in Central Otago and a newly developing pip fruit area in Nelson and Motueka. However, Canterbury was the main fruitgrowing area under his supervision. Blackmore covered the whole of his "district" in his first year of office by rail and bicycle. This was a noteworthy effort when it is realised that roads in those days were only roughly metalled and rail connections very limited.

A Gloomy Picture: 1894

Blackmore's first report, submitted in 1894, revealed the most unsatisfactory state of the industry in Canterbury, due, in the main, to neglect and ignorance of cultural methods. The report emphasised the prevalence of disease.

Codling moth, the scourge of the North Island, was just appearing in Canterbury, having being first reported in 1894 at Akaroa. Its spread was apparently being caused by the use of second-hand cases introduced from the North Island.

Other fruit pests reported as widespread in Canterbury at that time were oystershell (mussel) scale, pear mite, leaf-roller caterpillar, pear and cherry slug, leaf hopper, woolly aphis, leaf miner, and currant borer. Common fungous diseases were black spot of apples and pears, strawberry leaf blight, shothole fungus, silver blight, plum rust, and peach curl. At that time the most serious stone fruit disease, brown rot, had not yet appeared. Blackmore stressed the urgency for legislation to enforce the control of disease, particularly the imminent spread of codling moth.

Spraying Introduced: 1895

Blackmore tackled the district's problems in a practical manner by immediately introducing spraying to Canterbury growers. In an endeavour to make suitable spraying apparatus available he arranged with A. and T. Burt, engineers, Dunedin, to manufacture a sprayer with a compressed air chamber which would be suitable for fruitgrowers.

1890-96

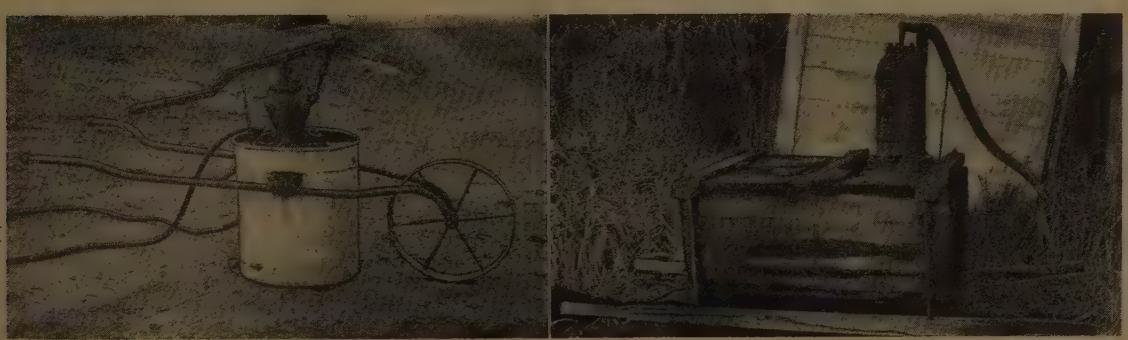
From illustrations it appears to have been a fairly accurate copy of American hand pumps in use at that time, usually mounted on a sledge. Before the introduction of this relatively efficient pressure pump, the only equipment available was a low-pressure, direct-action bucket pump with very unsatisfactory coverage capacity.

Disease-control Legislation: 1896

In 1896 the industry in Canterbury seemed to take a turn for the better. Through the campaigning of Blackmore, some spraying was done, some crops were cleaner than usual, and the market was more buoyant. Rail freights were reduced for fresh fruit and an increased duty was imposed on imported fruit. Nevertheless, the disease problem remained uppermost in the minds of all concerned with the future of the industry.

Codling moth continued to spread in Canterbury and in this year an outbreak was reported from Ashburton. It became increasingly obvious that effective control of the disease could not be obtained without legislation and the Department of Agriculture continued to press for the introduction of appropriate Government regulations.

The Orchard and Garden Pests Bill 1896 was prepared, but was held over for some time. Eventually it secured a hearing, but met with considerable opposition in Parliament. Many fruitgrowers objected to the provision requiring the restriction of sale of codling-infested fruit and eventually the codling moth clause was deleted from the Bill. The effect of the revised Bill was to aim at some measure of control over insect pests coming into the country on imported fruits, but it did little toward arresting the spread of pests already in local orchards.



Left—The first spray pump used in Canterbury in 1895. Right—One of the first spray pumps of the type introduced by J. C. Blackmore, Government Pomologist, in 1896.

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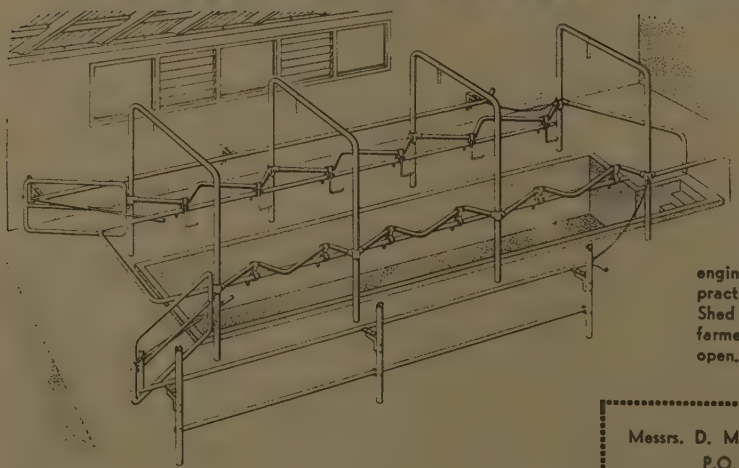

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Cider Manufacture: 1896

Meanwhile the local cider factory continued to make rapid progress. Fletcher Humphries and Co. (a name still well known in the Christchurch commercial world) established an up-to-date factory in 1896 and large quantities of local and North Island fruit were diverted from the market to this secondary industry.

Recommendations for planting at this time reflected the importance of the cider business, as some priority was given to cider varieties of apples. Other planting recommendations were for later-maturing apples (such as Sturmers), Williams' Bon Chretien pears for bottling, and small fruits, particularly strawberries and black currants.

Export of Apples First Mooted: 1897

The first mention of an export apple trade was made in 1897. Though the suggestion was discussed and one of the largest Canterbury orchards, the Styx Orchard Co., erected a packing shed, it was generally acknowledged that the colony was still by no means self-supporting in fruit and that a great improvement in local production was needed first. At this time some 20,000,000 lb. or about 500,000 bushels of fresh fruit were being imported annually. Though no doubt a large proportion of this was citrus and other sub-tropical fruits, some pip and stone fruits were required to satisfy local demand.

Export of apples from Canterbury was again proposed the next year and the Government agreed to a 1d. per pound guarantee. The venture was abandoned, however, owing to lack of shipping space.

Two important innovations to the fruit industry occurred in 1899. The first was of general interest to the whole colony: the full implementation of the Orchard and Garden Pests Bill provision affecting imported fruit. The Department's report for this year states: "A mere glance at the fruit shops in any of our towns is sufficient to show the enormous improvement that has been effected—bright, clean oranges, lemons, and mandarins now taking the place formerly only too frequently occupied by filthy inferior stuff that ought never to have been allowed to leave the orchard. The imported fruit, which is subject to inspection, now compares more than favourably with local grown, there being at present no power to inspect New Zealand produced fruit".

First Export Shipment: 1899

Despite this indictment of local orchard conditions, some Canterbury orchards must have been producing fruit of reasonable quality, for the long-awaited trial shipment of export apples to London was made in 1899.

The first shipment comprised solely Canterbury fruit, which was shipped from Lyttelton on 26 March 1899 per s.s. Papanui, an appropriate name for this vessel, as the orchardists who pioneered this venture under the auspices of the Canterbury Fruitgrowers' Association were the Styx Orchard Co., with Wilson Bros., and F. Sisson, of Papanui.

The shipment comprised 1,500 cases of apples and 50 cases of pears, packed in the "Brisbane" case, a solid box of Australian origin which allowed for no bulge or firm pack. In many instances individual apples were wrapped in tissue paper, with paper shavings lining the tops and bottoms of the cases. No regular pack was adopted, but an effort was made to "row" the fruit in after it had been roughly sized. Many of the varieties shipped are obsolete today, but others still figure largely in New Zealand's present exports. The shipment consisted of the following varieties:

Apples: Claygate Pearmain, Adams Pearmain, Cox's Orange, Cockle Pippin, Margill, Golden Russet, Boston Russet, Russet Nonpareil, Wilson's Royal, Lord Wolseley (a Canterbury seedling raised by Sissons), and Sturmer.

Pears: Beurre Clairgeau, Passe Colmar, Beurre Bosc, Beurre Superb, Beurre Easter, Winter Nelis, and Vicar of Winkfield.

This shipment apparently was not very successful. Though a satisfactory price for those days was obtained (average 10s. 1d. per case), many of the varieties sent were not very popular, severe bruising was reported, and the consignment clashed with the arrival of a shipment of 27,000 cases from Tasmania.

The official report on the shipment concludes: ". . . the shipment should have proved to New Zealand growers that the Colony is not in a position to export apples in any quantity yet, 1,500 cases of first quality fruit being all that could be raised in Canterbury. It should also prove the correctness of the assertion that a few special varieties only must be grown for export purposes".

The 19th century closed, therefore, with Canterbury fruitgrowing very much at the crossroads. Premature export aspirations were conflicting strongly with a local market provided very often only with irregular home-grown supplies of indifferent quality, and the future prospects of the industry were still quite obscure. Further endeavours to implement the Orchard and Garden Pests Bill 1896 for local fruit were continuing to meet with determined opposition. Codling moth by now was rampant in all parts of Canterbury and in spite of the success of some growers many were still producing fruit of very poor quality.

1896-1908

Considerable Improvement: 1900

In the first decade of the 20th century there were significant changes and considerable improvement in the fruitgrowing industry.

Though in the early part of the century the provisions of the Orchard and Garden Pests Bill were still not applied to local fruit, a new appreciation of fruitgrowing was being gradually engendered. Growers were not only planting more intelligently and with more attention to variety demand, but were giving more care to existing orchards.

Unsuitable varieties were gradually being removed and fruitgrowing was expanding in favourable districts and being abandoned in unfavourable localities. Orchard areas in the Ashburton district, for example, showed a sharp decline, the region being regarded as unsuitable owing to late frosts and heavy north-west gales. Plantings in Akaroa, never extensive, also showed a steady decline, due mainly to the problem of transporting fruit to the Christchurch market.

An indication that Canterbury growers were directing more attention to spraying is indicated in a report that Reece and Co., merchants, of Christchurch, had been appointed agents for a well known brand of American spray pump (£7 10s. each). On representation from the Department of Agriculture, these were allowed in from the U.S.A. free of duty.

Second Export Shipment: 1902

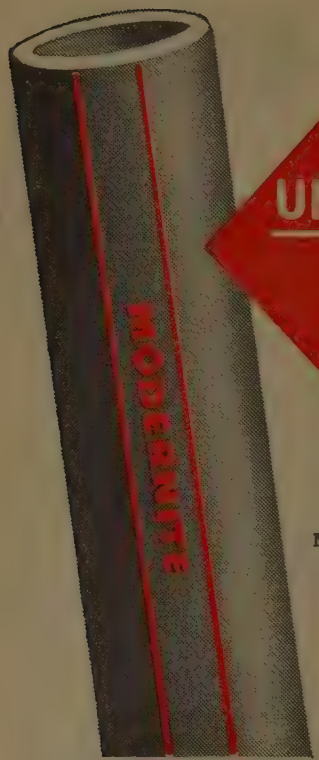
Canterbury's second export shipment of fruit was made in 1902. A further 1,500 cases of apples were shipped per s.s. Waikato, the fruit coming mainly from the Styx Orchard Co.

No Government guarantee was provided for this shipment, despite appeals from the growers, as it was thought the shipment would have no difficulty in paying its way, judging from the reception given the original (1899) shipment. Unfortunately, the fruit, which was frozen en route, arrived in poor condition and realised only from 3s. to 10s. per case.

Reports from London on the shipment indicated that there was still room for great improvement in grading, much of the fruit being unripe and dull green. Scale was also present on the fruit. The packing was said to be reasonably good. After this disastrous shipment Canterbury's interest in export of fruit to the United Kingdom waned, the initiative in exporting passing to other districts.

Important Legislation: 1904-08

Probably the most important and far-reaching legislation affecting New



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Zealand fruitgrowers, the Orchard and Garden Pests Act, was passed in 1904. Restriction on the sale of infested fruit came into force immediately and though growers were treated leniently at first, the standard of fruit marketed showed gradual but definite improvement in this first year.

In 1908 legislation for the control of all major pests and diseases was consolidated with the passing of the Orchard and Garden Diseases Act, which was much wider in scope than the previous Act. This Act endured, with amendments, for the next 20 years.

The industry thus became established on a sound basis in 1908 with every legal facility a growing primary industry might need provided for in the Act.

Fruitgrowing in Canterbury, however, did not expand greatly during this period. Owing to the improvement in cultural methods, local production certainly increased, but from a reduced number of orchards. Though some of the better orchards expanded, no new areas were developed. Nevertheless, by the close of the decade the local fruitgrowing industry was vastly improved compared with 10 years previously. Many problems still had to be overcome and many dark days still lay ahead, but fruitgrowing was now an established industry.

Boom Planting Years: 1910-20

During the next 10 years there occurred in New Zealand an unprecedented boom in orchard and small-fruit planting. Even the 1914-18 war failed to stop the planting fever and not until 1918 did planting slow down appreciably. Many thousands of acres of apples were planted throughout New Zealand during this era on both suitable and unsuitable land. Some orchards were doomed to early extinction; others ultimately became productive and profitable.

The planting boom can be attributed to the wide publicity then being given to fruitgrowing as a sound and profitable investment. The prospects of a good local demand with a potential overseas market that was claimed to be practically unlimited made the proposition financially attractive, and the life of a commercial fruitgrower was represented as being an easy and pleasant way of making a good living which appealed particularly to city folk, who were eager to invest in it.

Development of Waimate, Loburn, and Heathcote Areas

Canterbury participated in this rapid orchard expansion. Some 400 acres in the Waimate district, South Canterbury, were subdivided and planted with pip fruits from 1916 to 1918. In North Canterbury about 500 acres were planted in pip fruits in the Loburn and Rangiora districts from 1910 to 1920, and the Port Hills area also participated in this impetus to orchard planting.

Admirably suited to the growing of stone fruit and developed as a natural expansion of a productive area close to the city, the Horotane-Heathcote district was subdivided and planted between 1912 and 1918. Then followed the subdivision and development of the contiguous area of Avoca Valley between 1918 and 1920. This venture was initiated by J. F. Scott, who owned a large part of the Port Hills at the time. Since then, of course, the area has become renowned for production of tomatoes and apricots.

Raspberry Growing Begins

Concurrent with this development of tree fruit areas, a new and important berry fruit industry arose in two districts in Canterbury. Areas of raspberries and, to a less extent, loganberries, were established in the Waimate district, about 100 acres being planted in 1910. The initiative in this venture can be attributed to Z. Couzins, who was the undisputed leader in the Waimate raspberry area at the time of its inception. Not all the land used was suitable, however, and areas have since been reduced until today only about 75 acres of the most suitable blocks remain.

In the Riccarton-Yaldhurst district raspberry growing also began about this time. Cecil Harrow planted the first acre of raspberries at Upper Riccarton in 1910. Later he transferred to Yaldhurst, starting with 3 acres and gradually building up the family holdings until about 100 acres were in production.

Government Experimental Station: 1919

In addition to the rapid expansion of new areas during this period, existing orchards continued to improve and receive better attention. In fact, the First World War appeared to have little detrimental effect on the fruitgrowing industry in Canterbury except for the expected shortage of skilled labour on many properties.

1908-20

Growers now were fully conscious of the need for efficient spraying and more detailed cultural practices for better production. To improve their knowledge they began to agitate for the establishment of a Government experimental orchard in their district.

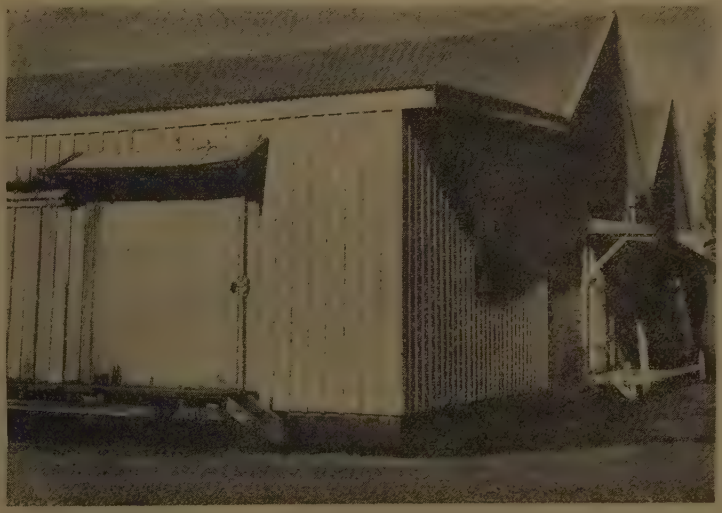
In May 1919, 4 acres of established orchard (trees from 10 to 20 years old) and 4 acres of adjoining grassland at Papanui were leased from R. Herdman Smith to provide the first local fruit experimental station in the South Island. The objects of the station were defined at the time as:

"(a) To determine that pests and diseases of fruit trees could be successfully controlled by the spraying compounds recommended by the Department [of Agriculture] for this purpose.

"(b) To test new spraying compounds.

"(c) To try out theories in reference to the control of orchard pests and diseases."

G. Stratford, at that time Orchard Instructor at Christchurch, was the first manager of this station. In his first year he began a series of spray trials for the control of black spot and achieved considerable success.



The first privately owned cool store in New Zealand. Built by Frank Sisson, Papanui, in 1910, it is still in use and is now operated for the Apple and Pear Marketing Board.

1920-30

Brown Rot First Reported: 1915

Meanwhile stone fruit growers received a setback when a disease new to the district (brown rot) appeared in 1915. It appeared to spread rapidly in its first season and took quite a toll of the stone fruit crop. Sprays were immediately tried, but results were poor or variable. The disease remains one of the major troubles in stone fruit crops in some seasons. Only in very recent times have satisfactory control measures been discovered.

Christchurch Market Good: 1920

By the early 1920s Canterbury was in a rather enviable position with fruit production and marketing. While growers in other districts were facing marketing problems and agitating for organised export and local marketing Canterbury producers, with a huge potential market in the rapidly growing city of Christchurch, had no comparable problem and were consequently less enthusiastic over any Dominion-wide marketing scheme. Their own market was reasonably assured and for some years they took no great part in the agitation for organised sales.

Elimination of Poorer Orchards: 1920-28

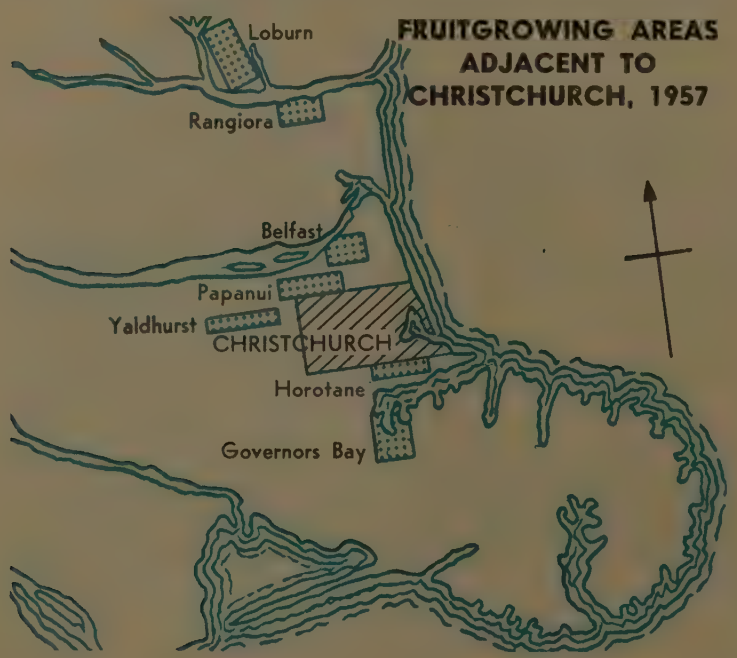
However, the newly developed orchard areas at Waimate, Loburn, and Rangiora were passing through a difficult phase of economic instability, which gradually sifted out the low-producing properties that had been planted on unsuitable land or had received unsatisfactory treatment. In Waimate many properties were converted to more profitable types of farming and eventually only about 100 acres remained.

In Loburn and Rangiora the reduction in area was less drastic and in fact further plantings in the more favourable Loburn area offset to some extent those lost in poor blocks. Of the original 500 acres planted, about 160 acres were cut out during the ensuing 10 years, but 48 additional acres were planted on the better Loburn land, so that there still remained a new and reasonably stable orchard area of about 388 acres.

Experimental Orchard Closed: 1924

With the elimination of the poorer orchards, steady progress was made during this period by the remaining orchardists. Disease control remained the growers' main problem and as soon as one pest or disease was kept in check another appeared.

In May 1924 the Papanui Experimental Orchard was closed, the 5-year lease of the property having expired. A large amount of trial work had been undertaken, mainly with the testing of old and new spray materials. Results had shown growers that effective control of major pests and diseases present at that time could be attained by applying the recommended sprays in the correct manner. It was therefore considered that the experimental orchard had served its purpose and it was not re-established elsewhere. The former experimental area orchard, now owned by Mr W. E. Davidson, is still producing heavy crops.



Fireblight Spreads to Canterbury: 1929

A serious new disease of pip fruit, fireblight, appeared in Canterbury in 1929. Fireblight, previously confined to the North Island, spread to the South Island in the spring of that year, when it was first noticed simultaneously in Christchurch and Kaikoura.

The Christchurch outbreak was confined in the first season to one pear tree in the grounds of the R.S.A. Clubrooms in Gloucester Street. The Kaikoura outbreak occurred in a hawthorn hedge in the outskirts of the township. Both sources of infection were removed and burnt, but in spite of these precautions, the disease continued to spread in the following years, though not in such a virulent form as that in the North Island.

Frost Damage: 1929

A serious late frost in the spring of 1929 caused widespread damage to stone and pip fruit crops. This was the first major loss encountered in this way by the younger generation of fruitgrowers and though Government assistance was provided, a few of the orchardists in the more susceptible areas never completely regained confidence in their properties and several orchards ultimately were pulled out. A large orchard at Waipara, North Canterbury, was removed on this account and several smaller areas were converted to other types of farming.

1930-57

Thus the law of the "survival of the fittest" continued to operate, and by a process of gradual elimination, the economic orchard areas emerged and progressively became more clearly defined.

Depression Years: 1931-35

The greatest test in economic survival came during the next few years when the depression of the early 1930s took its toll of fruitgrowers as it did of other classes of farmers. However, production continued to increase, in spite of some orchards being abandoned or becoming neglected, but prices for fruit remained very low.

As a result there was a local revival of interest in export of fruit and some fairly large shipments were dispatched during the years 1931-35. These accounted for only a relatively small portion of Canterbury's production, however. Out of an estimated pip fruit average production of 300,000 bushels, the amount exported from Canterbury annually was as follows:

	bus.		bus.
1930 ..	900	1935 ..	32,000
1931 ..	29,000	1936 ..	25,000
1932 ..	13,000	1937 ..	14,000
1933 ..	57,000	1938 ..	35,000
1934 ..	25,000	1939 ..	41,000

With the outbreak of war in 1939, resulting in a temporary cessation of export, Canterbury's interest in export marketing was no longer fluctuating or indifferent and has not since become so.

Second World War and Afterward: 1939-57

During the Second World War and up to 1948 there was no further planting. Moderate plantings have been made since, but mainly as extensions to existing orchards in Loburn and Ouruhia. No new areas have been developed.

On the other hand many of the old and historic orchards of the Papanui area have succumbed to the spread of the city. Not only have suburban housing schemes absorbed many of these orchards, but factories have been erected on some of this rich, fertile land. During the past 100 years about 500 acres of land in the Papanui area have been used at one time or another for the production of fruit. The area in orchard in that district in the 1890s was in the vicinity of 350 acres. The present area of Papanui orchards is under 200 acres.

It is estimated that during the next 10 years a further 50 acres of orchard will be absorbed into the city and so lost to production. The present trend is for these areas to be replaced in part by new plantings further out from the city, but in spite of this the areas in production are gradually declining.

Similarly there is a tendency for the valuable Horotane-Heathcote area to become more and more residential. The subdivision of small orchards for housing is constantly taking place, and though these are at present generally remaining in production, indications are that production will decline as this process continues.

FRUIT STATISTICS OF CANTERBURY
1957

Kind	No. of growers	Area acres	Production bushels
Pip Fruit			
Apples	93	697	169,000
Pears	46	104	30,000
Quinces ..	7	3½	1,000
Stone Fruit			
Apricots ..	32	114	21,500
Cherries ..	17	27	3,000
Nectarines ..	9	8	2,100
Peaches ..	30	56	9,800
Plums (European) ..	26	18	2,700
Plums (Japanese) ..	46	45	11,000
Berry Fruit			tons
Black currants	10	22½	40
Raspberries ..	61	170	400
Strawberries ..	47	68	165
Gooseberries ..	3	3	8
Loganberries ..	3	4	10
Total area in tree fruits ..			1,072½ acres
Total area in berry fruits ..			267½ acres
Total			1,340 acres

Future Development

If fruit production in Canterbury is to be maintained at a figure even approaching its peak level of the 1930s, some major planting will have to be undertaken within the next 10 years. Unless this happens Canterbury, the pioneer province of fruitgrowing in New Zealand, with the population of its capital city of Christchurch approaching a quarter of a million, will not only lose its place as a major fruitgrowing district, but will not even be self-supporting. There are still many areas in the province capable of development for fruitgrowing and it is here that growers who have the foresight should plan to produce fruit for the rapidly increasing urban population, which presents a huge potential market.

Part of a 90-year-old, 16-acre orchard in Papanui that has made way for commercial expansion in Christchurch. In preparation of a site for a proposed drive-in theatre, trees still in profitable production have been pulled out. Varieties included Lord Wolseley, Mobbs Royal, Ribston Pippin, and Dan's Maria.

Acknowledgments

Mrs E. Foster, Gloucester Street, Christchurch, for information on the early days.

Mr F. Sisson, Papanui, for details of the Sisson family.

Mr B. Turner, Woolston, for information and access to early records of the Canterbury Fruitgrowers' Association.

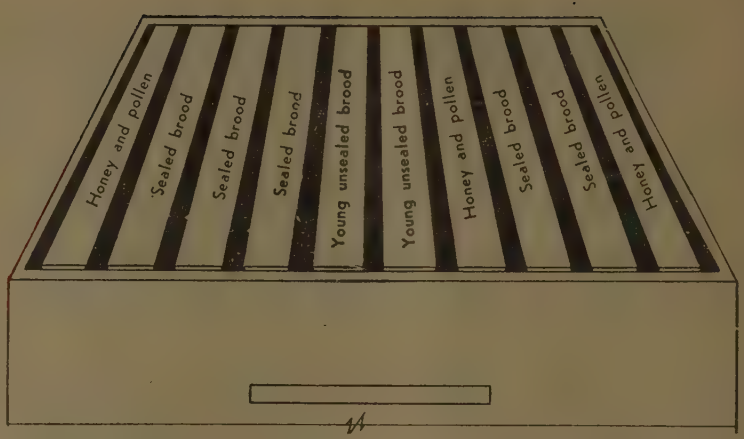
Mr J. D. Galletly, Senior Horticultural Inspector, Christchurch, for assistance in assembling data.

Simplified Queen Bee Rearing

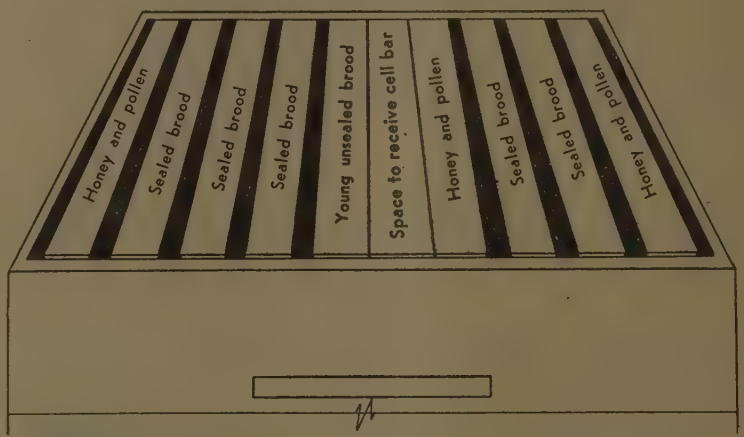
THE preparation of cell-finishing colonies and hive management to complete queen rearing are described by D. Roberts, Apiary Instructor, Department of Agriculture, Auckland, in this concluding part of an article on a simplified method of rearing queen bees. The first part of the article appeared in last month's "Journal".

QUEENLESS cell-building colonies will be found most satisfactory for the finishing of cells raised by this method. Colonies used for this purpose may be of one or two storeys, but must be of very good strength with all the combs well covered with bees. These colonies, being queenless, cannot maintain themselves, so it is necessary to add combs of emerging brood continually so that colonies remain at great strength throughout the period they are used. As with colonies used for breeder queens or cell starting, cell-building colonies must have had access to a good nectar flow or have been fed for 3 days immediately before their use.

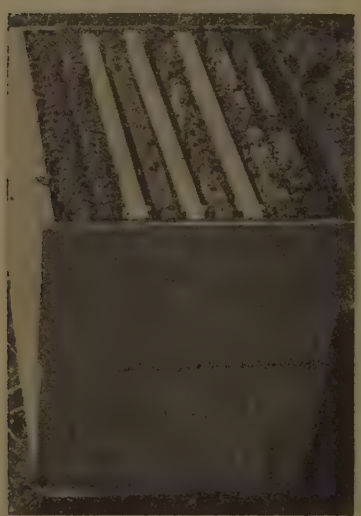
Colonies selected for cell building are prepared by removing the queen and all but two frames of young un-



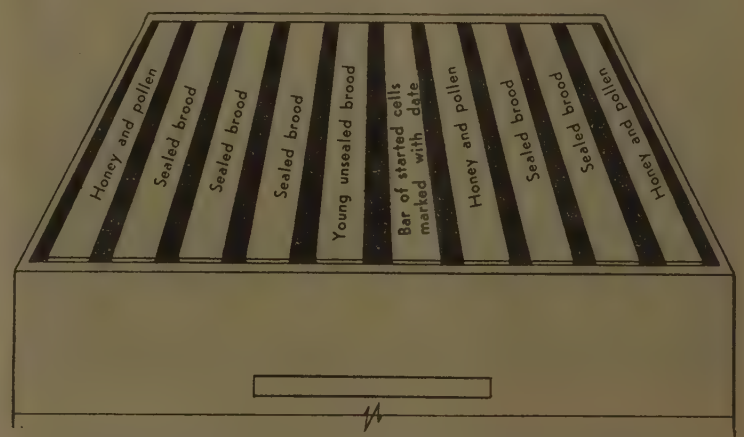
Arrangement of frames of sealed and unsealed brood, honey, and pollen in the setting up of a queenless cell-finishing colony.



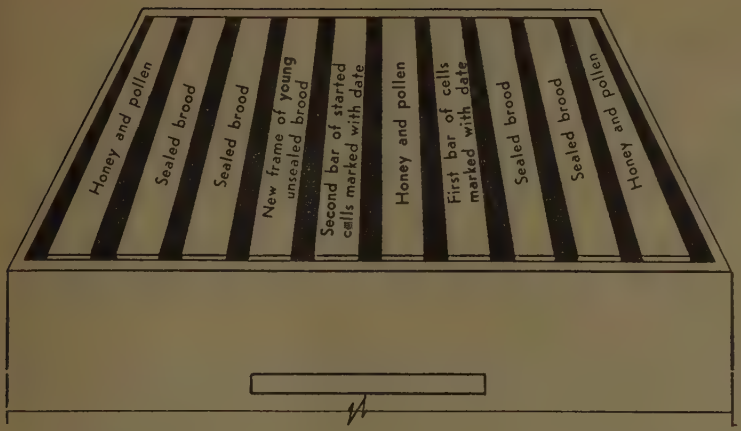
Cell-finishing colony prepared to receive cell bar. Bees which have been attending to the frame of unsealed brood just removed will cluster in this space and will begin to care for started cells immediately they are introduced. "



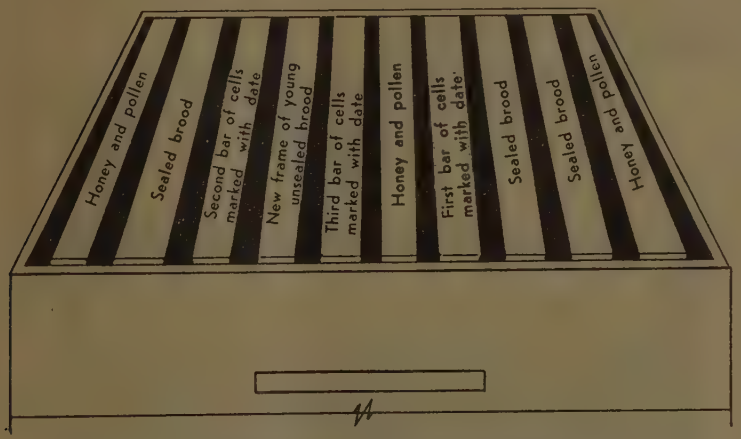
Two-storey cell-finishing colony cell bars are coloured white.



Arrangement of frames of sealed and unsealed brood, honey, and pollen after introduction of first bar of cells to queenless cell-finishing colony.



Arrangement of frames after introduction of second cell bar. As frames of sealed brood hatch they must be replaced with fresh frames of sealed brood.


Honey and pollen
Sealed brood
Second bar of cells marked with date
New frame of young unsealed brood
Third bar of cells marked with date
Honey and pollen
First bar of cells marked with date
Sealed brood
Sealed brood
Honey and pollen

Arrangement of cell-finishing colony at introduction of third bar of cells. The first bar of cells will be ready for removal before the fourth bar is introduced, if 4-day intervals are maintained. Frames of honey and pollen must be replaced as they are consumed.

Finished queen cells capped and ready for distribution to mating nuclei.

sealed brood. These two frames are placed in the middle of the hive with one frame of honey and pollen immediately alongside. A comb containing honey and pollen is placed on each of the outer sides of the hive and the intervening spaces are filled in with combs of sealed or emerging brood. Cell-building colonies should be prepared the day previous to that on which the first cells are to be given.

Where double-storey colonies are used the lower storey should be filled with combs of honey and pollen and the upper one arranged as already described. Whichever type is used it is essential that bee strength is maintained at the maximum possible.

Transfer of Started Cells to Finishing Colonies

An hour or so before the first frame of cells is to be given to the finishing colony one comb of unsealed brood (the one next to the centre comb containing honey and pollen) should be removed to provide the necessary space. In this the young nurse bees which have been feeding the brood just removed will cluster and will begin to care for the cells immediately they are introduced. The frame of cells thus rests between the centre pollen comb and the remaining comb of unsealed brood.

Three days later the remaining comb of unsealed brood should be removed and replaced with a frame of **newly hatched brood** to draw a maximum number of nurse bees to that part of the hive. The first frame of cells is then moved to the opposite side of the pollen comb and the space filled with the second batch of cells so that they rest between the pollen comb and the comb of **newly hatched brood.** Succeeding bars of cells can be given every 3 to 4 days, the comb of unsealed brood given previously being replaced each time with a comb of **newly hatched brood.** The accompanying diagrams show the arrangement of combs throughout. If the frames of cell bars are marked with the date when they are made up, the frames can be identified readily in the cell-building hive.

Ten days after first being made up the frames of cells will be ready to be removed from the cell-building hive and the cells to be separated and given to mating nuclei. As queenless cell builders may with this method tend to build cells of their own from the combs of newly hatched brood given periodically, they must be inspected every few days and any natural cells destroyed.

Great care must be taken at all times in handling queen cells and all jarring or shaking must be avoided. Bees clustered on the cells when they are removed from the builder colony

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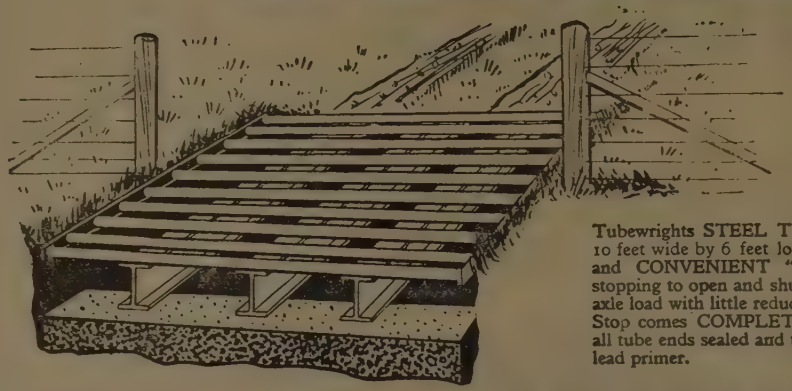

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Queen-mating Colonies or Nuclei

There are many ways of preparing the small colonies in which the queen cells will hatch and the virgin queens will be held until mated and laying. For the beekeeper rearing queens for his own use a standard hive body divided into two with a wooden partition and separate entrances at each end will be most suitable. The use of standard-size combs and hive bodies facilitates the addition or removal of frames of honey, bees, or brood which will be necessary from time to time to keep the nuclei at full strength. An additional advantage is that when queen rearing is completed the material can be readily utilised for normal honey production.

Whatever method is used the nucleus must contain enough bees of different ages to maintain the correct temperature for the cell and to care for the young queen when she has emerged. As nuclei may be subject to robbing when the weather is unfavourable or there is no honey flow, their strength should be such that they have a reasonable chance of defending themselves. Provision of sufficient food is of the utmost importance and stores must never be allowed to fall to a level where the young queen may lack proper nourishment for her development.

The best food for nuclei is honey stored in the comb and this should be used whenever possible. If honey in the comb is not available and the nuclei must be fed, a heavy sugar syrup fed in a division board feeder is the most satisfactory substitute. Feeding syrup to nuclei greatly increases the chances of robbing, particularly if a honey mixture is used or there is no nectar flow. Once started robbing is most difficult to stop and every precaution should be taken to prevent its starting.

Preparation of Nuclei

In preparing a hive body for nuclei the body is divided lengthwise by a wooden partition held in place on the ends and bottom board by wooden strips. The partition must be beetight and flush with the top edges of the hive body. A cover of canvas or other hard-wearing material should be tacked to the top of the division board so that each section can be examined separately.

To overcome the risk of drift of bees from one nucleus to the other and the possibility of the queen entering the wrong colony on return from a flight, separate entrances on the end and side must be provided for each nucleus. Nuclei are made up with a comb of honey and two to three frames of sealed brood and adhering bees from strong colonies. To prevent the bees of the nuclei drifting back to their parent colonies, nuclei are best made up in another apiary and then transported to the queen-rearing yard. So that there will be no undue loss while the nuclei are being filled the entrance can be tightly blocked with grass or wire gauze.

Mating nuclei when made up in out apiaries for removal to the queen-rearing apiary should be kept confined for at least 24 hours, being released after dusk the next day. Where the nuclei have to be made up from colonies in the apiary in which they are to be established they should be confined for 48 hours. The longer period of confinement will prevent serious weakening of the nuclei through bees returning to the parent colonies. Whatever method of forming mating nuclei is used, it is most important that adequate strength is maintained when the nuclei are in use. Weak nuclei will be more subject to robbing and besides requiring very close attention are not likely to give the best results.

Queen-mating nuclei must be always prepared a day or so ahead and be ready for accepting cells 10 days after the cell bars are given to the starter colony or swarm box. Where queen rearing is practised in early spring mating nuclei sometimes tend to destroy cells given when there is a sudden deterioration in the weather, which often occurs at this time. This is one of the hazards of early season queen rearing and though at times little can be done other than to replace the damaged cells, supplementary feeding with sugar syrup will often minimise these losses.

Nucleus mating colonies made up and brought in from other apiaries seem less prone to tear down cells in bad weather than do those prepared from colonies in the queen-rearing apiary.

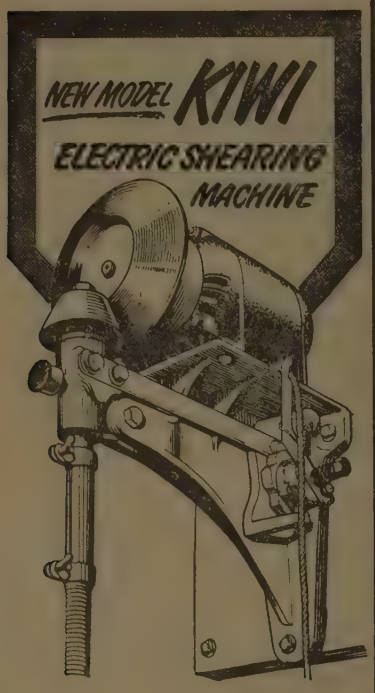
The transfer of young mated queens from the mating nuclei to the working colonies will be governed by the requirements of the individual beekeeper. However, use of any of the types of mailing cage generally will be most satisfactory for the beginner.

Success with any system of queen rearing depends mainly on provision of ample food at all stages.

References

Jay Smith, "Better Queens", Florida (1949).

H. H. Laidlaw and J. E. Eckert, "Queen Rearing", Dadant (1950).



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The Home Garden in June

By A. G. KENNELLY,
Horticultural Instructor, Department of Agriculture, Dunedin

TO most gardeners the growing year differs from the calendar year. To the gardener the garden year is the growing season, usually starting with spring and finishing with winter. By June, therefore, most gardeners can assess the results of the past year's work in the garden and plan or look forward to the next season.

BY June the growing season is practically finished, but it is not too early to give some thought to the forthcoming year's programme, particularly to the most favourable rotation of crops, to the choice of varieties suited to the area, and to the maintenance or improvement of the soil.

Winter, when the work of planting, sowing, and cultivating crops is greatly reduced, is usually a good time to attend to such jobs as the building of garden equipment or furniture or the improvement of garden amenities. Garden seats, bowers, trellises, and fences can be made or repaired. For those who do not already possess one, a frame or compost box will be found useful.

June is a good time, too, to repair or make paths or drains. Temporary paths laid across the soil can be forked up and the soil left so that it can be broken down by the weather, or permanent paths can be laid. Usually, paths made of hard-wearing material such as brick, stone, concrete, or even bitumen are preferable to grass. Grass paths are readily damaged in winter, when growth is slow, conditions are wet, and traffic is relatively heavy; in summer grass dries out or needs frequent cutting to prevent seed developing and falling on the garden.

Wet areas that are now showing up should be drained by field pipes or by open material such as shingle and stones in the bottom of a trench. Effective drains can also be made by digging a trench and putting manuka scrub or similar material in the bottom or, if the texture of the soil is open enough, by putting in boards in the form of a bottomless box. All such material should be deep enough not to interfere with deep digging or to cause the topsoil to dry out excessively in summer.

Spring cabbage can still be set out in most gardens; also cauliflower in sheltered situations or in districts where winters are not too severe. Soils should be well drained and adequately enriched, preferably with organic material such as compost and farmyard or stable manure. Celery and leeks should receive their final earthing up if this work has not yet been done, and the digging of potatoes should be completed without delay. Broccoli (winter cauliflowers) should be watched for signs of approaching maturity and the developing curds protected by bending or breaking a leaf or two over each head.

Land from which crops have been recently harvested and which is to be used within the next month or so should be dug over to improve drainage and assist the rotting of root fibres and similar residues and to expose insect pests and their eggs to birds and other destructive agencies. Green crops that are in the flowering stage or approaching it or are growing on land soon to be used for a vegetable crop should be turned in to rot down. If digging is left for the future, the weather may make it more difficult.

Liming may be advisable and June and July are generally suitable months for applying lime, as in many gardens a considerable area is then bare of crops and winter and spring rains can usually be relied on to wash the lime down into the soil.

Asparagus fern growth should be cut down, if this has not been done, and the bed can be mulched with compost or a light dressing of farm-

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yard manure. The compost heap can be turned or remade if required.

The advantages of a well planned home garden should show in June, and though the kinds of vegetables available may vary from district to district, root crops should be available in variety as should some of the winter greens, such as winter cauliflower, savoy or winter cabbage, curly kale, and brussels sprouts. There should also be celery, silver beet, spinach, winter rhubarb, leeks, and lettuce, and, in store, potatoes, onions, pumpkins, squash, and in some gardens kumaras and Jerusalem artichokes.

Broad Beans

Broad beans can still be sown in well drained soil as advised in last month's "Journal". Broad beans are particularly hardy and are usually harvested when in most gardens vegetables are scarce and lacking in variety. The commonest varieties include the long-podded and the broad-podded or Windsor types.

Cabbages and Cauliflowers

Seed of cabbages and cauliflowers for successional planting can be sown now. Among the round, smooth-leafed type of cabbages, Golden Acre is excellent. In good conditions it is quick maturing and tender and in addition does not grow too large. Varieties of cauliflower such as Early London, Walcheren, and All Seasons are suitable for sowing now in most districts for planting out in early spring.

Except in a few specially favoured districts, seed should be sown in a sheltered, prepared bed with a favourable aspect or in a frame or cool, open glasshouse. Sowing in boxes is not recommended, but if the seed is sown in boxes, they should be deep enough to provide ample root room. Thinning may be advisable later.

The seed bed for cabbages and cauliflowers should be deeply and thoroughly cultivated and the soil enriched with compost or well rotted material. Lime should be applied to most soils not recently dressed; 2 oz. to 4 oz. per square yard annually is usually satisfactory. Seed can be sown broadcast in beds, but for convenience of weeding and for ease of lifting is usually best sown in rows about 12 in. apart. In heavy soil seed should be sown not more than ¼ in. deep.

Cabbage plants of the pointed type for spring use can still be set out in most districts. In districts having a mild, rather warm winter, however, smooth-leafed round cabbage is often preferred, as it is considered that the hardier, pointed types of cabbage tend to grow too rankly under such conditions. Cauliflower can also be set out where the situation is not too exposed and winter conditions are not too severe. Hardy varieties such as Walcheren and All Seasons should be chosen in the colder districts.

Compost

Composting in the home garden has become increasingly popular and important in recent years, probably largely because of the difficulty of obtaining animal manure from farms and the relatively greater development of urban population resulting from industrialisation.

The importance in home gardens of returning all organic waste from the kitchen and garden to the soil can

[*Sparrow*

Spinach succeeds in cooler conditions than most other vegetables and a sowing can be made in well drained, friable soil in June in many home gardens.

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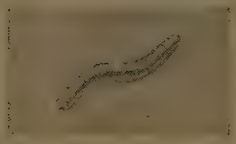

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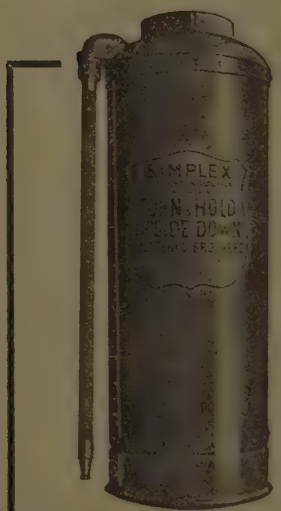

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hardly be over-emphasised and the properly constructed compost heap offers an efficient method by which waste material can be converted to vitally needed humus. In most soils that have been intensively cultivated for a number of years without the return of adequate supplies of organic material which can be converted to humus it is difficult to maintain a good tilth. The soils tend to break down and lack body, and the maintenance of favourable conditions of moisture and aeration is thus difficult.

June is a good month in most gardens to start a compost heap, because a good deal of crop residue usually becomes available then and it is not always convenient to dig it into the ground immediately. Crop residues should not be burnt unless they are too woody to rot steadily or are diseased.

The compost heap should be reasonably handy for the housewife and easily accessible with a wheelbarrow. Proximity to water, too, is a consideration in large heaps which dry out quickly.

Aeration

Compost heaps need not be of any special shape and the size will be determined mainly by the amount of material available. The important points to consider are aeration, retention of moisture, and drainage. Aeration from the base should be provided by a drainpipe or a quantity of open material, such as woody hedge clippings, or both. Properly constructed bins usually have a grid at the bottom to which air is supplied by a pipe. Adequate ventilation to induce a good draught through the mass is essential in the first stages of composting, but in the maturing heap it is not required and may even be wasteful of organic matter such as nitrogen and ammonia. Pipes should be blocked or removed in the later, maturing stages of the heap.

Methods of composting vary widely in detail, but the principles are similar in all. Layers of the materials to be composted are alternated with thinner layers of farmyard manure or a heavy sprinkling of artificial manure rich in nitrogen. Lime is usually added to reduce acidity and so enable the bacterial activity to increase. Heaps are usually relatively long and about 3 ft. 6 in. to 4 ft. wide and rarely higher than 4 ft. In heaps smaller than about 4 ft. wide by about 4 ft. long the ratio of exposed surface is disproportionately large compared with the volume and the breaking down of the material is slower. A bin is desirable for small heaps.

The rate of decay depends largely on the nitrogen content of the materials and the supply of moisture and air. For retaining walls wood is best, but wire netting will do. Stone, concrete, iron, or brick is usually considered less satisfactory unless side aeration is provided. No floor other than the earth is needed, though an air supply from the bottom is essential. A special wooden container, or preferably a series of them built so that the compost can be turned successively as breaking down occurs, is excellent. A box about 12 ft. long, 4 ft. wide, and 4 ft. high divided into 3 compartments by movable partitions and a movable end to facilitate turning and removal of the compost is suitable.

May is usually the preferred time for sowing broad beans, but they can still be sown in June in most gardens.

Activator

An activator is needed to speed the process of breaking down. Either organic material such as fowl or farmyard manure or dried blood or mineral fertiliser such as sulphate of ammonia (either alone or in combination with other organic or mineral fertilisers) can be used.

Layers of the material to be rotted can be about 6 in. to 8 in. thick. Green, sappy materials should be laid loosely; drier and more strawy material should be moistened and firmed and preferably chopped up finely.

The carbon to nitrogen ratio for optimum breaking down is about 10 : 1. Sufficient nitrogenous or sappy material is therefore essential for speedy rotting. Layers of organic manure such as farmyard or poultry manure should be 1 in. to 2 in. thick according to the amount of litter the material contains. The less concentrated it is, that is, the more litter it contains, the thicker it should be. If dried blood is used, it should merely be sprinkled on fairly heavily. The manure can be topped off with a layer of soil and the next layer of trash then applied. Lime can be sprinkled either on the layer of soil or in the middle of the layer of garden trash.

When organic material for use as an activator is not available a more balanced plant food than that obtained by the use of sulphate of ammonia alone can be obtained by using a mixture of 4 parts of sulphate of ammonia, 3 parts of superphosphate, 1 part of muriate or sulphate of potash, and 2 or 3 parts of ground limestone, all by weight, at about 6 lb. to 1 cwt. of average, mixed, partly wilted garden

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HAREWOOD, CHRISTCHURCH.

[*Photo News*

Composting of garden rubbish is a useful practice. Its principles are discussed in this article.

[*Green and Hahn*

Asparagus should be cut before the seed ripens, as otherwise the seed may fall and seedlings establish to the detriment of the bed.

trash. The more strawy or fibrous the material is in relation to sappy material the greater will be the amount of sulphate of ammonia required. (If the amount of sulphate of ammonia is increased, more lime also may have to be added.) When used alone as an activator sulphate of ammonia should be added at about 2 lb. to 1 cwt. of mixed, partly wilted garden trash; about 1 lb. to 2 lb. of carbonate of lime should also be used.

Air Vents

In very wet, soggy heaps rotting is usually speeded by making vertical air vents 3 in. to 4 in. in diameter at the top of the heap with a crowbar or rake handle at intervals about 1 ft. from the sides of the heap. Though much depends on the material and the layering, the temperature should rise within a week or two of the completion of the heap. When the heat begins to decline the heap should be turned (it by then should have sunk about a third), the layers being mixed and the unrotted material turned to the middle

A compost heap should be kept moist but not wet and it should be tested periodically for moisture content by inserting a stick, withdrawing it, and examining the adhering material for moisture. An unsheltered heap can be ridged to an inverted V to help shed the rain. Exposed portions of the heap can be covered with a layer of soil 2 in. to 5 in. thick to retain heat and moisture.

Spraying exposed heaps with lindane or DDT will give protection against flies.

Radio Broadcasts for Farmers during June

RADIO broadcasts for farmers will be given during June as follows:

1YA Auckland, 7.45 p.m.

4 and 18 June—Talk by officer of Animal Industry Division, Department of Agriculture, Auckland.

11 June—"Winter Feeding of Stock", by H. McM. Bull, Instructor in Agriculture, Department of Agriculture, Auckland.

25 June—"Care of Farm Machinery", by J. Doutre, Machinery Instructor, Department of Agriculture, Auckland.

1XH Hamilton, 12.33 p.m.

9 June—"The Young Farmers' Club Movement", by D. F. J. Pilkington, Cambridge Y.F.C.

16 June—"Lambing Troubles", by D. Bilkey, Livestock Instructor, Department of Agriculture, Hamilton.

23 June—"Incidence of Feed Flavours, 1957-58 Season", by G. Purvis, Superintendent of Butter Instruction, Department of Agriculture, Hamilton.

30 June—"Meat and Wool Matters", by A. W. Moore, Federated Farmers, Hamilton.

1YZ Rotorua, 7.15 p.m.

11 June—"Recent Evidence of the Performance of some of the Newer Spray Materials", by B. M. Piper, Horticultural Instructor, Department of Agriculture, Tauranga.

25 June—"Increasing Lambing Percentages", by M. B. Mackenzie, Livestock Instructor, Department of Agriculture, Tauranga.

2XG Gisborne, 8 p.m.

10 June—"For the Poverty Bay Orchardist", by J. D. Overbye, Horticultural Instructor, Department of Agriculture, Gisborne.

23 June—"Report on Extension Division Work in Poverty Bay", by H. de O. Chamberlain, Instructor in Agriculture, Department of Agriculture, Gisborne.

2ZA Palmerston North, 12.33 p.m.

9 June—"Feed Crops in the Manawatu", by J. A. Graham, Fields Instructor, Department of Agriculture, Palmerston North.

16 June—"Weed Control in Small Fruit", by G. N. Paulin, Horticultural Instructor, Department of Agriculture, Palmerston North.

23 June—"Management of Drained Paddocks", by K. L. Mayo, Field Drainage Officer, Department of Agriculture, Palmerston North.

30 June—"Farming Trends in Chatham Islands", by E. A. Madden, Agronomist, Department of Agriculture, Palmerston North.

2XA Wanganui, 8 p.m.

5 June—"Canadian Newsletter", by Mary MacDonald.

12 June—"The Radio Vet.", by S. Jamieson, Veterinarian, Department of Agriculture, Wanganui.

19 June—"Preparing Wool for Sale", by P. C. Marshall, Sheep and Wool Instructor, Department of Agriculture, Wanganui.

26 June—"The Rukuhia Research Station", by A. A. Duncan, Instructor in Agriculture, Department of Agriculture, Wanganui.

2YZ Napier, 7.10 p.m.

3 June—"Winter Feeding of Stock", by F. H. Collin, Instructor in Agriculture, Department of Agriculture, Hastings.

17 June—"Handling of Stock before Slaughter", by F. D. Usher, Meat Inspector, Department of Agriculture, Hastings.

3YA Christchurch, 12.20 p.m.

16 June—"Review of 'The New Zealand Journal of Agriculture' ", by E. G. Smith, Instructor in Agriculture, Department of Agriculture, Rangiora.

4YA Dunedin and 4YZ Invercargill, 12.33 p.m.

9 June—"Soil Conservation", by W. O. Sly, Soil Conservator, Department of Agriculture, Invercargill.

16 June—"Diseases in Cattle", by J. A. Milne, Veterinarian, Department of Agriculture, Dunedin.

23 June—"Farm Drainage", by I. R. Falconer, Drainage Officer, Department of Agriculture, Invercargill.

30 June—"Tree Planting to Prevent Erosion", by R. V. Maxwell, Soil Conservator, Department of Agriculture, Kurow.

Regular Sessions

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8 p.m. (Northland livestock report and "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 8 p.m. ("News for the Farmer").

1YA Auckland, Mondays at 12.33 p.m., Tuesdays, Wednesdays, and Thursdays at 7.45 p.m., and Fridays at 6 p.m. and 7.45 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m. (Pig Council talk on fourth Wednesday of every other month at 12.33 p.m.), Thursdays at 12.33 p.m.

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m., Fridays at 8.2 p.m. (Gisborne stock market report).

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8.1 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawke's Bay orchardist session), Tuesdays at 7.10 p.m., Wednesdays at 7.15 p.m. (Hawke's Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Mondays and Thursdays at 12.33 p.m.

4YA Dunedin, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m., Wednesdays at 12.33 p.m. and 6.50 p.m. (Burnside stock market report), Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m. and 7.15 p.m. (Lornevile and Gore stock market reports), Wednesdays at 12.33 p.m., and Thursdays at 12.33 p.m

Proper Disposal of Offal Most Important Measure in Control of Hydatids

HYDATIDS can be eradicated, but farmers should not rely solely on dosing their dogs with arecoline every 3 months to do the job. Arecoline does not kill either hydatid eggs or hydatid tapeworms; it only causes them to be purged out. The most important preventive measure is to stop dogs getting raw offal.

DOGS are infested with hydatid tapeworms only by eating raw offal (liver, lungs, heart, spleen, the intestines, and surrounding fat and membranes) containing hydatid cysts. Hydatid cysts in offal can survive for 21 days or more after the death of the sheep. Hydatid eggs are passed by infested dogs and these eggs can live on the ground for up to 3 months under normal New Zealand conditions. Tremendous numbers of eggs can be passed by a dog—dogs have been found to have up to 20,000 hydatid tapeworms, and each worm may shed 500 to 800 eggs at a time.

Veterinarians are often asked if cats and rabbits also spread hydatids to humans, but the answer is no; neither cats nor rabbits play any part in the hydatid life cycle.

Arecoline

The dosing of dogs with arecoline is valuable as an additional measure to proper disposal of offal in combating hydatids. On its own dosing with arecoline will not eliminate hydatid infestation. Even if they are completely cleared of tapeworms, dogs can become re-infested immediately and will pass hydatid eggs 7 weeks later. Neither hydatid tapeworms nor hydatid eggs are killed by arecoline; they are purged out and should be buried or burned and the hindquarters of the dog washed.

Arecoline is approximately 90 per cent. efficient in expelling hydatid tapeworms. In addition, some dogs will not purge, others vomit the drug, and others are extremely difficult to dose.

The Department of Agriculture does not want farmers to cease dosing their dogs with arecoline, as it is a valuable weapon in the fight against hydatids, but neither does it want farmers to rely solely on arecoline to solve their hydatids problem. The drenching of dogs cannot in itself eliminate hydatid disease. The hydatid life-cycle can only be broken if the re-infestation of dogs is prevented by their not being given infected food.

Winter Knitting for the Family

THE three knitted garments shown in the family group at right will be very warm and cosy for cold, winter days. The cable-stitched cardigan and the honeycombed cardigan are in double-knitting wool and the girl's jumper is closely knitted in 3-ply wool. Directions for knitting these three patterns are given below.

Cable-stitched Cardigan

ABBREVIATIONS: K., knit; p., purl; st., stitch(es); fin., finishing; patt., pattern; rem., remain; foll., following; sl., slip; rep., repeat; inc., increase; dec., decrease; in., inch(es); beg., beginning.

Measurements: Length 27in.; sleeve 19in. To fit a 40in.-42in. chest.

Materials: 28oz. of double-knitting wool; 2 No. 7 and 3 No. 9 knitting needles; small cable needle; 5 buttons.

Tension: Two complete patterns measure 3in.

Back

Using No. 9 needles cast on 129 st. and work in k. 1, p. 1 rib for 1½in.

Change to No. 7 needles and the foll. patt:—

1st row: K. 3, p. 1, k. 4, p. 1. Rep. from * to last 3 st., k. 3.

2nd row: P. 3, k. 1, p. 4, k. 1. Rep. from * to last 3 st., p. 3.

Rep. last 2 rows once.

5th row: K. 3, p. 1, sl. next 2 st. on to a spare needle and hold at back of work, k. 2, then k. 2 from spare needle, p. 1.

Rep. from * to last 3 st., k. 3.

6th row: As 2nd row.

These 6 rows form the patt. Rep. them until work measures 17in., fin. after a 6th patt. row.

To Shape Armholes

Keeping continuity of the cable patt., dec. 1 st. at each end of next 19 rows, then on every alternate row until 37 st. rem.

Cast off.

Pocket Linings

Using No. 7 needles, cast on 39 st. and work in patt. as for back until work measures 5in., fin. after a 6th patt. row. Leave on spare needle.

Right Front

Using No. 9 needles, cast on 63 st., and work in k. 1, p. 1 rib for 1½in.

Change to No. 7 needles and the foll. patt.:—

1st row: * P. 1, k. 4, p. 1, k. 3. Rep. from * to end.

2nd row: * P. 3, k. 1, p. 4, k. 1. Rep. from * to end.

Rep. last 2 rows once.

5th row: * P. 1, cable 4, p. 1, k. 3. Rep. from * to end.

6th row: As 2nd row.

These 6 rows form the patt. Rep. them until work measures 6½in., fin. after a 5th patt. row.

Next row: Patt. 9, then patt. across next 39 st. and leave on spare needle, patt. to end.

Next row: Patt. 15, patt. across 39 pocket st., patt. to end.

Cont. in patt. until work measures 17in., fin. after a 6th patt. row.

To Shape Front and Armhole

Dec. 1 st. at beg. of next row and every 4th row foll. until 17 st. in all have been dec., but at the same time dec. 1 st. at end of row and at armhole edge on next 18 rows; then dec. 1 st. at armhole edge on every alternate row until 1 st. remains. Fasten off.

Left Front

Using No. 9 needles, cast on 63 st. and work in k. 1, p. 1 rib for 1½in.

Change to No. 7 needles and the foll. patt.:—

1st row: K. 3, p. 1, k. 4, p. 1. Rep. from * to end.

2nd row: * K. 1, p. 4, k. 1, p. 3. Rep. from * to end.

Rep. last 2 rows once.

5th row: * K. 3, p. 1, cable 4, p. 1. Rep. from * to end.

6th row: As 2nd row.

These 6 rows form the patt. Rep. them until work measures 6½in., fin. after a 5th patt. row.

Next row: Patt. 15, then patt. across next 39 st. and leave on spare needle, patt. to end.

Next row: Patt. 9, patt. across 39 pocket st., patt. to end.

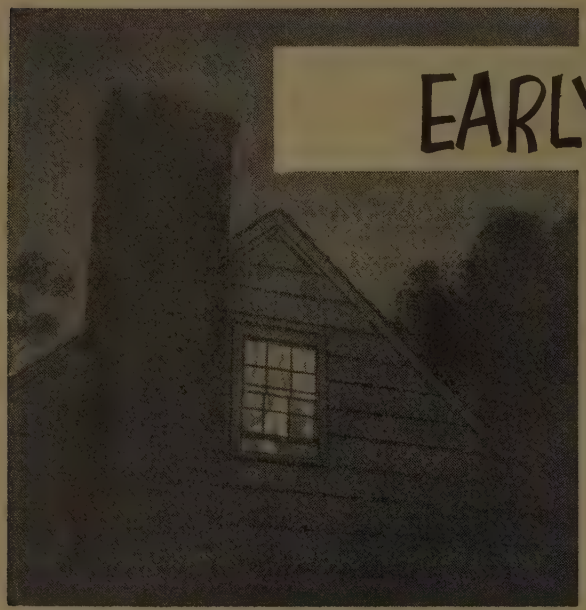
Now work to match right front, reversing all shapings.

Sleeves

Using No. 9 needles, cast on 44 st., and work in k. 1, p. 1 rib for 2½in.

Next row: Rib 1, work twice into next 2 st., * rib 1, work twice into next 3 st. Rep. from * to last 5 st., rib 1, rib twice into last 2 st., rib 2 (75 st.).

Change to No. 7 needles and patt. as for back for 6 rows, then inc. 1 st. each



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end of next row and every foll. 10th row until there are 93 st.

Cont. straight until sleeve measures 19in. or required length from beg., fin. after a 6th patt. row.

To Shape Top

Dec. 1 st. each end of next 19 rows, then dec. 1 st. each end of every alternate row until 3 st. rem. Work 3 tog. and fasten off.

Pocket Tops

Go back to st. left on spare needle for pocket tops. Rejoin wool, and using No. 9 needles, work in k. 1, p. 1 rib for 1in. Cast off.

Left Front Border

First sew front and back together at shoulders. Then with work right side toward the knitter, and using No. 9 needles, beg. at centre back and pick up and k. 86 st. to the start of the front shaping, and 114 st. to lower edge.

Now work in k. 1, p. 1 rib for approx. ¾in., fin. at lower edge.

Next row: Rib 10, * cast off 2, rib 22 (including st. left on right hand needle from casting off). Rep. from * 3 times, cast off 2, rib to end.

In next row cast on 2 st. in place of those cast off.

Work in rib for ¾in. more, then cast off in the rib.

Right Front Border

With work right side toward the knitter and using No. 9 needles begin at lower edge and pick up and k. 114 st. to the start of the front shaping and 86 st. to centre back.

Work in k. 1, p. 1 rib for 1½in., then cast off in the rib.

To Make up

Press work on the wrong side with a hot iron over a damp cloth. Sew in sleeves, then sew up sleeve and side seams. Sew pocket linings into position, then sew down small side edges of pocket tops. Sew together back neck edges of front borders. Sew on buttons. Press seams.

★ ★ ★

Honeycombed Cardigan

ABBREVIATIONS: K., knit; p., purl; st., stitch(es); patt., pattern; tog., together; rep., repeat; cont., continue; beg., beginning; foll., following; fin., finishing; in., inch(es); dec., decrease.

Measurements: To fit 36in. bust. Length from shoulder, 19in.

Materials: 14oz. of double-knitting wool; 2 No. 4 and 2 No. 6 knitting needles; 7 buttons.

Tension: 15 st. to 3½in. and 5 rows to 1in.

Right Front

Using No. 6 needles, cast on 38 st. and work in k. 1, p. 1 rib for 4in.

Change to No. 4 needles.

Next row: K. 1, then k. 1, p. 4 to last 2 st., k. 2.

Work in the foll. patt.:—

1st row: P. 2, then k. 4, p. 1 to last st., p. 1.

2nd row (right side): K. 1, then k. 1, p. 4 to last 2 st., k. 2.

3rd row: As 1st row.

4th row: K. 1, * insert needle between 6th and 7th st. on left hand needle, pull loop through and place on left hand needle, k. the loop tog. with the next st., p. 4, k. 1, * p. 4 **. Rep. from * to ** to last 7 st., then rep. from * to * once, k. 1.

5th row: As 1st row.

6th row: As 2nd row.

7th row: As 1st row.

8th row: K. 2, p. 4, * insert needle between 6th and 7th st. on left hand needle, pull loop through and place on left hand needle, k. the loop tog. with the next st., p. 4, k. 1, p. 4. Rep. from * to last 2 st., k. 2.

These 8 rows form the patt. Rep. them until work measures approx. 10½in., fin. after 8th patt. row (4 complete patts.).

To Shape for Sleeve and Neck

Keeping continuity of the patt., cast on 5 st. at beg. of next row and foll. alternate row, thus fin. at front edge.

Next row: K. 1, p. 2 tog., patt. to end.

Next row: Cast on 5 in patt. to end, allowing for dec. st., then cast on 5 st. at sleeve edge on next 3 alternate rows. Then cast on 10 st. at beg. of next 3 alternate rows at side edge, but at the same time dec. inside edge st. on front edge on every 6th row, always twisting first patt. loops with less st. between diamonds, until 5 st. in all have been dec. at front edge, then cont. straight until sleeve edge measures about 5in., fin. after a 3rd patt. row. Leave the 93 st. on spare needle.

Left Front

Work to match right front, reversing all shapings (that is, shaping for sleeve after a 7th patt. row) until sleeve edge measures about 5in., fin. after a 3rd patt. row.

Back

Next row: Patt. across 93 st., cast on 12 st. for back neck, patt. across 93 st. of right front. (198 st.)

Cont. in patt. across all st. until straight edge of sleeve measures about 10in., fin. after a 6th patt. row.

To Shape for Sleeves

Cast off 10 st. at beg. of next 6 rows, then cast off 5 st. at beg. of next 12 rows.

Cont. straight for 4 complete patts., but instead of looping the last row (8th row), work as for 2nd row, thus matching fronts.

Change to No. 6 needles and work in k. 1, p. 1 rib for 4in.

Cast off in the rib.

Right Front Border

With work right side toward the knitter and using No. 6 needles, begin at lower edge and pick up and k. 24 st. along welt, 42 st. to beg. of front shaping and 54 st. to centre back neck.

Work in k. 1, p. 1 rib for 3 rows, thus fin. at lower edge.

Next row: Rib 2, * cast off 2, rib 7 (including st. left on right hand needle from casting off). Rep. from * 5 times more, cast off 2, rib to end.

In next row cast on 2 st. in place of those cast off.

Work 3 more rows in rib and cast off.

Left Front Border

Work to match right front border, beginning at centre back neck and omitting buttonholes.

Cuffs

With work right side toward the knitter, and using No. 6 needles, pick up and k. 40 st. along sleeve edge and work in k. 1, p. 1 rib for 3in.

Cast off in the rib.

To Make up

Press work with a hot iron over a damp cloth. Sew up sleeve and side seams and sew back neck edges of border together neatly. Sew on buttons and press seams.

★ ★ ★

School Jumper

ABBREVIATIONS: K., knit; p., purl; st., stitch(es); patt., pattern; cont., continue; sl., slip; rep., repeat; in., inch(es); dec., decrease; tog., together; rem., remaining; foll., following; inc., increase.

Measurements: Length from shoulder 18in.; sleeve seam 15in. To fit a 30in. chest.

Materials: 8oz. of 3-ply wool; 2 No. 14 and 2 No. 12 knitting needles.

Tension: 8 st. to 1in. measured over pattern.

Back

Using No. 14 needles, cast on 120 st. and work in k. 1, p. 1 rib for 3in. Change to No. 12 needles and foll. patt.:—

1st to 4th rows: Stocking stitch.

5th row: K. 2, p. 2 to end of row.

6th row: As 5th row.

7th to 10th rows: Stocking stitch.

11th row: P. 2, k. 2 to end of row.

12th row: As 11th row.

These 12 rows form the pattern, cont. until back measures 13in.

To Shape Armholes

Still keeping continuity of patt. cast off 6 st. at beg. of next 2 rows, then cast off 2 st. at beg. of next 2 rows, then dec. one st. at both ends of next 4 rows. (96 st.) Cont. without further shaping until back measures 18in.

To Shape Shoulders

Cast off 10 st. at beg. of next 6 rows, leaving rem. 36 st. on spare needle for back neck ribbing.

Front

Work as for back until armhole shaping is complete, then cont. straight until front measures 16in., ending after a wrong-side row.

To Shape Neck

Patt. 38 st., sl. rem. st. on to a spare needle and cont. working on first 38 st. for left shoulder.

Next row: Patt. to end.

Next row: Patt. to last 2 st. k. 2 tog.

Rep. last 2 rows 7 times (30 st.).

Cont. straight until front measures the same as back to shoulder shaping, ending at side edge.

Cast off 10 st. at beg. of next and foll. alternate row, work one row, cast off remaining 10 st.

Return to st. left on spare needle and leave 20 st. on spare needle for neck ribbing, rejoin wool to rem. 38 st. and work to match left shoulder, but reverse all shapings.

Sleeves

Using No. 14 needles, cast on 56 st. and work in k. 1, p. 1 rib for 3in. Change to No. 12 needles and patt. as given for back, but at the same time inc. one st. at both ends of 9th and every foll. 10th row until there are 80 st., then cont. straight until sleeve measures 15in. or required length.

To Shape Top

Dec. one st. at both ends of next and every foll. alternate row until 64 st. rem. Then dec. 1 st. at both ends of every row until 20 st. rem. Cast off.

Neck Ribbing

First join right shoulder seam, then with right side of work facing and using No. 14 needles, begin at top of left shoulder and pick up and knit 25 st. down shaped edge of front, knit across 20 st. on spare needle, pick up and knit 25 st. along shaped edge as far as shoulder seam, knit across 36 st. left for back neck. (106 st.) Work 1in. in k. 1, p. 1 rib. Cast off in rib.

To Make up

Press all work with a hot iron over a damp cloth. Then join left shoulder seam and neck ribbing, side, and sleeve seams. Insert sleeves and finally press all seams.

Welsh Cheesecakes

WELSH cheesecakes are an excellent way of using up small amounts of pastry left over from making a pie crust or similar baking where there are scraps of short pastry.

Ingredients

3oz. of butter
3oz. of sugar
3oz. of flour
3oz. of ground rice
2 eggs
1 teaspon of baking powder
Black currant jam
Short pastry

Line patty tins with short pastry and put a small amount of jam in each. Cream together the butter and sugar. Add 1 egg and beat the mixture well. Add the sifted flour, then the other egg, and lastly fold in the ground rice and baking powder. Put a teaspoon of this mixture over the jam in the patty tins and bake in a moderately hot oven (400 degrees F.) until the filling and pastry are cooked. (15 to 20 minutes.)

—MAUD B. STRAIN,
Home Science Instructor,
Department of Agriculture,
Dunedin

Cauliflower Cheese with Bacon

WINTER weather sharpens the appetite and an ideal Sunday-night meal is cauliflower cheese with bacon, the recipe and instructions for which are given below.

1 medium cauliflower
12 oz. of milk
1 clove of garlic
A sprig of thyme
A small bunch of parsley
½ cup of cheese
4 rashers of chopped bacon
¾ cup of soft breadcrumbs
½ oz. of butter
Pinch of cayenne pepper
2 oz. of butter
4 tablespoons of flour
1 teaspoon of salt

Break the cauliflower into heads, one for each serving, and plunge them into boiling, salted water. Tie the herbs into a small bag made of muslin or clean sheeting. Gently simmer the herbs and milk for 10 minutes.

White Sauce

Make a white sauce with the following ingredients, using the herb-flavoured milk:

Melt the butter, mix in the flour and salt, and then carefully stir in the hot milk. Heat the sauce until it is thick. Melt the ½ oz. of butter and heat the soft breadcrumbs until they are a golden colour. While the crumbs are browning preheat the oven to 350 degrees F. (medium heat), drain the cauliflower, and arrange the heads in an oven-proof dish. Add ½ cup of cheese and the cayenne pepper to the sauce; pour it over the cauliflower. Sprinkle the bacon and breadcrumbs on the top of the cauliflower and heat it in the oven for 20 minutes, or until the bacon is cooked.

—BETTY JOHNSTON,
Home Science Instructor,
Department of Agriculture,
Wellington

Butter Cakes

By BETTY JOHNSTON,
Home Science Instructor,
Department of Agriculture,
Wellington

Three types of butter cakes. On top is a rainbow spice cake with lemon and walnut icing, on left is a chocolate cake with peppermint icing and chocolate chip decoration, and on right is a cherry cake.

THE basic butter cake recipe given in this article makes a delicious cake, and it is additionally useful to the housewife who wishes for variety in her baking, because it is suitable for use with many additional flavours.

A TRUE butter cake has approximately equal weights of flour, sugar, and eggs. The cake is made by beating the butter and sugar to a soft creamy consistency, then adding the beaten eggs in three or four lots and beating the mixture thoroughly between each addition. Lastly the dry ingredients are added alternately with the liquid. The mixture may be baked in patty tins, sandwich tins, or in a deep tin to make a loaf cake.

Standard Butter Cake

3oz. of butter
6oz. of sugar
6oz. of flour
3 eggs
2 teaspoons of baking powder
1 to 2 tablespoons of milk
Flavouring if desired

The tins should be prepared and the oven heated before mixing of the cake is begun. Sift and weigh the dry ingredients, weigh the butter and sugar, and break the eggs into a bowl.

Preparation of Cake Tins

Patty tins: Grease evenly with melted butter.

Sandwich tins: Grease well with melted butter and then dust with flour. Shake the tin so as to coat the inside completely with flour and shake out the excess flour. If the cake mixture contains golden syrup or chocolate, which may make the cake stick to the tin during baking, cover the bottom of the tin with greased paper (strips of butter paper are excellent for this purpose), as well as greasing the tin.

Larger cake tins: Grease and flour the tin. Line the bottom of the tin with greased paper. For rich fruit cakes it is as well to put a layer of brown paper over the bottom and sides of the tin before putting in the lining of greased paper.

Method of Mixing

Soften but do not melt the butter. Beat the butter, gradually adding the sugar. When the mixture is light and creamy, with no gritty sugar crystals, add the beaten egg, beating well between each addition. If the mixture shows signs of curdling before all the egg is added, mix in about 2 to 3 tablespoons of flour. Add any liquid flavourings or colouring matter. Fold and stir in the sifted dry ingredients alternately with the milk. It is better not to beat the mixture at this stage, but if an electric mixer is used, it can be turned to a low speed.

The mixture may need slightly more milk if it seems rather stiff.

Pour the cake mixture into prepared tins and bake it at the appropriate temperature as given below:—

Layer cake (sandwich tins) at 360 degrees F. (moderate oven) for 20 to 30 minutes.

Loaf cake (larger tin) at 340 degrees F. for 45 to 60 minutes.

Patty cakes (patty tins) at 360 degrees F. for 10 to 20 minutes.

Recipe Variations

The standard recipe may be varied in many ways by the addition of fruit, nuts, and flavourings such as grated lemon skin, cocoa, coffee essence or soluble powder, spice, and of colourings. Some suggestions are:—

Chocolate: With the flour add 2 tablespoons of cocoa or 3 tablespoons of drinking chocolate, or 2 tablespoons of melted chocolate. Use peppermint- or vanilla-flavoured chocolate icing.

Lemon or orange: Add the juice and grated rind of ½ lemon or 1 teaspoon of orange rind and 2oz. of orange juice. Use lemon- or orange-flavoured butter icing decorated with walnuts.

Coffee: Add 1 tablespoon of coffee essence or 2 tablespoons of soluble coffee powder to the flour. Use a coffee icing decorated with walnuts.

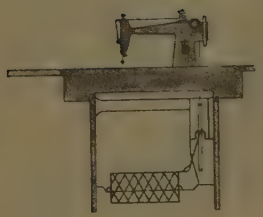
Mocha: Add 1 tablespoon of cocoa and 1 tablespoon of coffee essence. Use coffee icing. Shake toasted, desiccated coconut on to the wet icing.

Spice: Add 1 teaspoon of mixed spice and 1 teaspoon of cinnamon to the flour. Use a lemon-flavoured butter icing. Top with grated lemon rind.

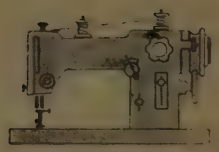
Cherry: Add at least 4oz. of chopped and highly floured cooking cherries. Almond essence may also be added to the butter-sugar-egg mixture. Use either plain butter icing or butter icing flavoured with almond essence. Decorate with cherry halves.

Rainbow: Divide the butter-sugar-egg mixture into three and make one part chocolate, one part spice, and colour the third part pink. Mix the three parts very roughly together and pour the mixture into a prepared baking tin.

Patty cakes: The proportion of flour and butter may be enlarged by 3oz. (making a total of 9oz. of flour to 3 eggs and 6oz. of sugar and butter). Slightly more milk will be needed. To ice patty cakes make a fairly soft icing and dip the top of each cake into it.

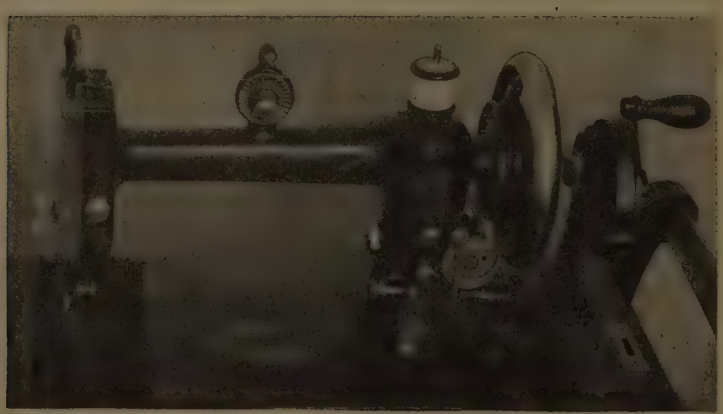


Sewing Machines



ONE of the earliest and most welcome labour-saving devices for the home, the sewing machine, has revolutionised the making of clothing and other articles which were formerly sewn by hand. Though many attempts had been made previously to produce a machine capable of duplicating the movements of hand sewing, it was not until 1850 that the first really practical model was patented. This was a lock-stitch machine with an eye-pointed needle and shuttle which could sew continuously any kind of seam and was relatively simple to operate.

By ELEANOR COUSTON,
Home Science Instructor,
Department of Agriculture,
Christchurch



THERE is now such a wide variety of makes and models of machines on the market that a knowledge of their performance is advisable before one is bought. They range from modestly priced, self-operated machines to luxury-class, automatic zigzag stitchers encased in elegant cabinets. Choice will depend mainly on satisfactory performance and on the buyer's requirements and circumstances; that is **on the amount and type of sewing she intends to do and how much she is prepared to spend.**

Servicing and Guarantee

A good machine, if properly cared for, will give a lifetime of service, and proof of this can be seen in garments made by models of 40, 50, or even 75 years old. Though every woman may not be an expert sewer, most can, with the help of a machine, make simple frocks, children's clothes, curtains, and bedspreads. If the machine is used consistently, the savings in clothing and furnishing costs will in a few years defray the initial cost of the machine.

← Two early models which are operated by hand. The upper one is over 100 years old and the lower one is still in constant use after 75 years' service.

Precautions should be taken to ascertain whether the firm selling the machine is prepared to service it and whether replacements and attachments are readily available. New machines of reliable make will carry a guarantee which gives extra protection to the customer.

Choice of Machine

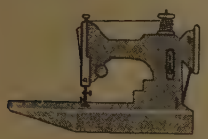
As it would be a long task to examine every kind of machine, a certain amount of elimination can be done by first deciding the following questions.

Self-operated or Power-operated Machine?

Though power-operated models are in more general demand, self-operated machines of the hand or treadle type still find a market either because of low cost or because there is no electric power, as in some country areas. An electric motor and in some cases a light can be fitted later when power becomes available. Many older people who have become proficient in the use of self-operated models prefer to continue using them.

The advantages of the power-operated machines are that less effort is required and their greater speed. Starting, stopping, and rate of working are controlled by foot or knee action and the hands are free to manipulate the article being made.

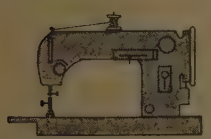
Cabinet or Portable?



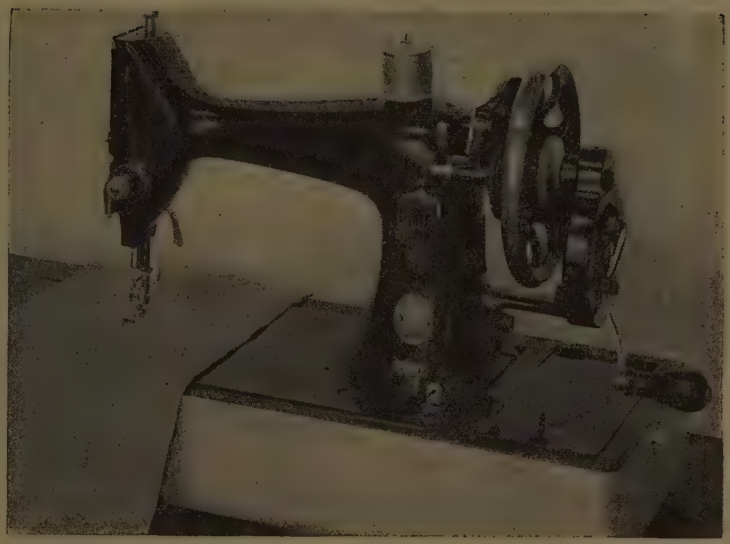
There is no question that any piece of equipment will be used more frequently if it is always assembled ready for use. Therefore, for the person who has a permanent sewing unit or corner a cabinet model is preferable, but if floor space is limited, a portable model which can be put away may be more practical. If a firm table is available for the machine, the extra cost of a cabinet can be saved.

If a portable machine is required, the weight must be carefully considered, as even portable models vary from light machines of about 11½ lb. to those which may weigh up to 40 lb. or more.

Zigzag or Straight Sewing?



Because of the considerable difference in price between a straight sewing machine and a zigzag model which will readily produce a variety of fancy



Up-to-date hand-operated machines are still produced.

The treadle machine is the choice of many who live in areas without electricity.

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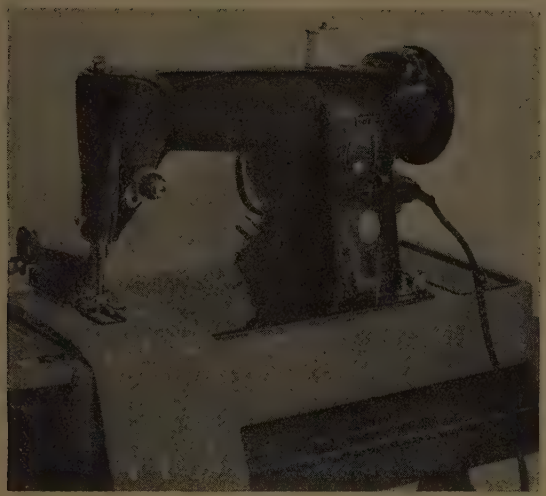


An electric straight-sewing machine with an attachment for making buttonholes.

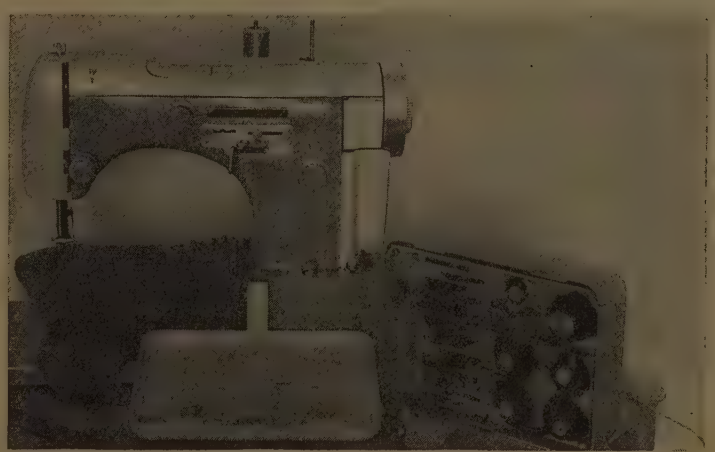
An electric model which weighs only 14 lb. The materials on the machine are leather, felt, and cloth, all of which have been stitched equally well.

stitches the buyer should decide whether the extra expenditure for the latter type will be warranted. For the average home sewer an efficient straight sewing machine will fulfil most utilitarian requirements, particularly if it is a make for which attachments can be obtained. With attachments buttonholes can be made, buttons sewn on, hems turned, and ruffling done for curtains.

On this automatic zigzag machine the flick of a lever can produce a variety of fancy stitches. A twin needle can be used to do two-colour embroidery or fine pin-tucking.

However, if cost is not a major consideration and if the machine is to be used by someone who wishes to create novel decorative effects, a zigzag model will be first choice. Though zigzag machines have been used extensively for commercial work for some time, only within the last few years have models suitable for the home sewer been available.

Displays of fancy stitching, applique design, and decorative monograms which can be done by the flick of a lever have caught the public's fancy, but the glamour of such embroidery may not be lasting. More practical features are the ability of these machines to stitch buttonholes without an attachment; sew on buttons or do



A free-arm automatic zigzag machine with the darning foot in use. A selector indicates which cams to insert for various embroidery stitches.

"blind" hemming; overcast seams; sew stretchable seams on jersey or foundation garments; and do mending, patching, and darning more easily.

Automatic or Non-automatic Zigzag?

As well as doing the usual straight sewing both types of zigzag machines, the automatic and non-automatic, have a swing needle which operates in either two or three positions. Altering a lever or turning a dial will make the needle stitch from side to side as well as up and down, so forming a zigzag line. An even zigzag stitch such as is used for oversewing, or a close satin stitch for monograms or buttonholes, can be produced by altering the width of the zigzag and the length of the stitch.

To get greater variety in decorative stitching with the non-automatic type the lever or dial is moved by hand at a certain rhythm or by a counting of stitches. This requires some degree of skill, but with practice a large variety of stitches can be made.

On the other hand the fully automatic models use special cams or wheels which form intricate patterns without any manual control. In some cases the stitches are limited to the number of cams incorporated as fixtures in the machine, and in others one or more cams are inserted according to which pattern is required.

Flat-bed or Free-arm?

Though a flat-bed machine is adequate for most sewing work, a free-arm model facilitates the sewing of circular work such as armholes and cuffs or darning of socks. Free-arm machines are supplied with a removable bed plate which can be used to support other kinds of sewing.

Judging Performance

The most satisfactory way to evaluate performance is to see the machine demonstrated and then to try it for oneself. What appears to be very simple under the hand of a skilled operator may be complicated and difficult for the amateur.

Points to check before buying are:

Stitching

The first essential is that the machine will produce good straight stitching on all kinds of fabrics. Most demonstrating is done on firm cotton or linen, but a truer test can be made using fine, slippery fabrics and, for contrast, a very thick material. It should be possible to regulate both the size of stitch and the tension readily.

A console model which besides doing all the work of a modern automatic zigzag machine is also a beautiful piece of furniture.

Most modern machines will reverse stitch by flicking a lever and this feature simplifies "finishing off" seams. With zigzag models the zigzag stitching as well as the straight stitching should be satisfactory. A good test is to compare the evenness and neatness of the buttonholes which different machines can make. Similarly where the claim is made that the machine will "darn", the ease and quality of the darning both on fabrics and socks should be noted.

Noise and Vibration

Smooth and quiet running are desirable features of a machine. Some models vibrate excessively at both high and low speeds, others relatively little.

Threading the Machine

Threading the machine, including the winding and insertion of the bobbin, should be easy. An annoying feature of some machines is that the bobbin tends to fall out of its case during insertion or in others the head of the machine must be tilted back to place the bobbin in position.

Control of Speed

The speed of the machine should be easy to control so that the operator can obtain either fast or slow speed as desired. Starting should be easy, and on removal of pressure from the control the machine should stop immediately.

Presser Foot

To sew thick materials or several thicknesses of any cloth it should be possible to raise the presser foot sufficiently high to feed the material under it. In some models the foot can be raised to two different levels, the first with tension on the thread and the second with pressure released.

Attachments or Controls

Many of the attachments previously provided with straight sewing machines have never been used. This may be because they looked too complicated or because the owners did not take time to acquire skill in using them. To be an advantage attachments should be easy to use, and with the zigzag models the controls should be conveniently located.

Cotton Blocks

Though cotton blocks are usually the result of incorrect technique when starting sewing, they occur more often with some zigzag machines than with straight sewers. Therefore a feature to look for is whether a block can be remedied easily. The makers of one recent model with a movable shuttle claim that this eliminates clogging.

Light

A built-in light conveniently placed to illuminate the sewing area without producing glare will greatly facilitate work.

Sewing Over Pins

As in much sewing today pins rather than basting are used to hold the fabric in place, a machine which sews over pins has a definite advantage.

The evolution of the zigzag sewing machine is not yet complete and further refinements can be expected. Interest shown by consumers has led to increased competition among manufacturers both in the versatility of their machines and in cost. However, variations in performance still exist, and only by comparison can a true evaluation be made. A degree of conservatism is perhaps advisable, as, like a good recipe, the "tested and tried" may be superior to the new.

All photographs by Green and Hahn.

Rhododendrons and Azaleas

RHODODENDRONS and azaleas are valuable flowering plants that provide colour from late winter to early summer. Rhododendrons can be considered the aristocrats of ornamental plants, and the colours of azaleas can be matched by few other ornamental shrubs. In this article J. P. Salinger, Horticulturist, Department of Agriculture, Wellington, describes the culture of these plants. The notes on garden work for June are by Rosalie A. Campion, Horticultural Instructor, Department of Agriculture, Wellington.

BOTANISTS have decided that all azaleas belong to the genus *Rhododendron*, but the distinction between azaleas and rhododendrons is fairly clear to the gardener. Rhododendrons are all evergreen with large, leathery leaves and bell-like flowers, but azaleas are deciduous or, if evergreen, have small leaves and the flowers are more open.

In practice this distinction is fairly important, as azaleas will tolerate more sun than most rhododendrons.

In this article azaleas and rhododendrons will be considered as separate types of plants.

The *Rhododendron* genus is a very large one containing several hundred species, and a great many garden hybrids; however, the average gardener will be interested mainly in those which will flourish and flower well and this reduces the number which should be selected. The azaleas are practically all garden hybrids and in their own way the different types are as distinct as the rhododendron varieties.

Use in the Garden

Most people planning a garden decide that a certain plant or type of plant will look suitable in a particular position. With rhododendrons, though, it is more important that the position chosen should suit the plant.

Rhododendrons are essentially plants which should be grouped with other shrubs and most are ideal for growing under deciduous trees; if they are planted under conifers or evergreen trees, the lower branches of the trees should be removed and the trees should be widely spaced so that an open effect is created, not dense growth. This method has been followed at Pukeiti where extensive planting of rhododendrons is being carried out in bush country in Taranaki by the Pukeiti Rhododendron Trust.

HEADING PHOTOGRAPHS: The sweet-scented flowers of *Rhododendron fragrantissimum* make this plant one of the most valuable shrubs for the spring garden. Right—The brilliant flowers of *Azalea mollis* are set off against the background of evergreen shrubs. This lightly shaded position is ideal for azaleas and rhododendrons. Elliott photographs.

[*Elliott*

This large rhododendron, White Pearl, planted beneath taller trees provides an effective background to a corner of the garden.

In general, rhododendrons are unsuitable as single isolated specimens on a lawn, as they do not stand up to severe wind or very strong sun and their shape is too irregular to contrast with the formality and distinct shape required from isolated plants in such positions.

The most suitable use of rhododendrons is as a broad, sheltered border or a group planting containing rhododendrons, camellias, maples, and heaths interplanted with bulbs such as lilies, fritillarias, and wood hyacinths. They also combine well with deciduous trees which produce a thin overhead cover, such as flowering cherries, silver birch, and deciduous oaks.

The dwarfer types and evergreen azaleas are ideal in rock gardens or for edging a shrub border, as they grow slowly and usually flower when young. In these positions they provide a solid mass of green, which provides a contrast to other brightly coloured plants.

Deciduous azaleas can be classed as spring flowering shrubs and planted in a mixed shrub border. In larger gardens they provide a wonderful display when grown in beds backed by conifers and surrounded by grass, as has been done at Massey Agricultural College, Ilam (Canterbury University property near Christchurch), and certain botanical gardens.

Soil Conditions

Rhododendrons, including azaleas, belong to the heath family (*Ericacae*) and so require a moderately acid soil and are intolerant of alkaline soils or lime. They have a fibrous root system and suffer if the soil becomes waterlogged; on the other hand the soil must not become too dry for long periods.

Ideally they flourish in a well drained soil that is enriched with well rotted organic matter, such as decayed compost, very old farmyard manure, peat, or leaf mould. They benefit from regular mulching with similar materials or with sawdust, but a mulch of fresh lawn mowings would be unsuitable.

They need comparatively little feeding with fertilisers and their main requirements are nitrogen as blood and bone (4 oz. per square yard annually) and sulphate of potash (1 oz. per square yard annually). Some deficiencies of the minor nutrients such as magnesium have been suspected in certain areas, as judged by leaf condition, but so far little is known of this aspect.

In a naturally alkaline soil it is seldom possible to acidify the soil sufficiently to grow rhododendrons well. Even where suitable soil is brought in, water from the surrounding area may make this soil alkaline. In a neutral or slightly acid soil the acidity can be increased by applying sulphur at 1 oz. per square yard.

Because azaleas and rhododendrons have fibrous root systems, beds containing these plants should never be dug with a spade. The beds may be lightly forked in spring to remove weeds and break the soil crust, and regular mulching will reduce weeds to a minimum.

Effect of Weather

Most rhododendrons and azaleas are very intolerant of wind, especially salt-laden wind, the damage caused by it being shown as brown edges to the leaves. Extremely strong sunshine can also be harmful, especially to young shoots in early summer or when it occurs during a long period of dry weather. In fact cool, still conditions of open woodland are ideal for most of these plants.

Rhododendrons can be grown in nearly all parts of New Zealand where the soil is suitable. However, in the North Island they do better away from the sea, at higher altitudes. The further north the garden is located the higher the altitude should be for their successful cultivation, as such localities have good rainfall and generally cooler conditions. In the Auckland area the choicer types should be planted on the south side of a shelterbelt or in a shaded depression.

Frosts in winter seldom damage hardy species, and less hardy types should in any case be grown in a shady position. Late-spring frosts can damage opening flower buds in early-flowering varieties and cause a browning similar to the disease bud blast. If heavy frost has occurred on a still night, the damage can be lessened by spraying over the plants with water from a hose before the sun raises the temperature above freezing point.

Planting Rhododendrons

In nurseries, rhododendrons and azaleas are grown in pots or in the open ground; in the open ground they are lifted with soil round their roots and this is surrounded with scrim or occasionally polythene sheeting. Though offered for sale during most of winter, they are best planted in September or October, as they will then root very freely in their new position.

If planted in mid winter, they form new roots very slowly and at the same time the leaves lose moisture which the plant cannot replace. If the plants already have flower buds at planting time, they may be allowed to flower the first season. As soon as the flower trusses fade they should be removed just above the topmost leaves.

When the planting site is being prepared, the area round the final position should be forked over and the soil broken down. The actual planting hole should be double the size of the root ball; the topsoil should be removed and the subsoil forked over; well chopped rotted turf or well rotted compost should be mixed with the subsoil together with 2 oz. of blood and bone. In clay soils where the hole might become a sump for water the area should be drained or a shallow hole made so that, when finally in position, the plant is above the surrounding area.

If the sacking round the roots is dry or if the plant is in a pot, the roots should be placed in a bucket of water for ½ hour before planting. The plant should then be brought to the planting site and placed in the hole; the scrim should be untied or the pot removed; if roots are penetrating through the scrim, it should not be pulled off but just loosened or cut off round the collar of the plant. Similarly if there is a great deal of loose soil round the roots, the plant should not be lifted out of the scrim, but placed in the planting hole and the scrim allowed to lie beneath the roots. Polythene should always be removed completely.

In a windy position support should be provided by a short hardwood stake hammered into the soil; the top of the stake should be below the level of the lowest branches.

The topsoil should be well broken up and shovelled back round the roots, being firmed as each layer is filled. The final soil level should be just above the topmost roots. Finally a thin mulch should be laid over the surface and the plant well watered. The stem should be tied to the stake with an old nylon stocking, and in an exposed position the plant should be protected from the wind with branches of broom, manuka, or macrocarpa set upright in the soil on the windy side.

If the weather is very hot after planting, the plants will benefit from a spray of water over the leaves in the morning and evening; this is often more beneficial than watering the soil, especially if this is still moist.

Training and Pruning

Rhododendrons and azaleas grow with a natural branching habit and need little training. However, the most important operation is to remove the old flower heads before seeds set each year, unless the seed is needed for propagation.

The flower heads should be cut or snapped off at their bases, care being

▼ The rhododendron Countess of Haddington produces scarlet, waxy bells of flowers and is suitable for general garden planting. Elliott photograph.

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taken not to damage the new shoots arising from the axils of the uppermost leaves. These flower heads should be composted and not left lying beneath the plant.

Many varieties make large plants and can become too big for their position. In this case the plant can be cut back with a pruning saw. The larger branches should be removed close to a small side branch near the base, and these side branches should be left unpruned to protect the young growth which develop below the pruning cuts. This operation is carried out in late spring.

Deciduous azaleas sometimes fail to produce sufficient young growths as the bushes grow older. In this case some of the older shoots should be removed at the base, the plant mulched with compost, and a dressing of 4 oz. of blood and bone per square yard applied. New shoots will then grow from the base. These azaleas often become covered with lichen which appears to restrict growth. Spraying with 3 : 4 : 50 bordeaux mixture in winter to kill the lichen is a good practice.

Propagation

As most rhododendrons and azaleas are selected plants of true species or hybrids, they are usually propagated vegetatively. It is possible, however, to obtain a range of colours from seed of selected plants of deciduous azaleas.

Vegetative propagation is carried out by layering, grafting, and from cuttings.

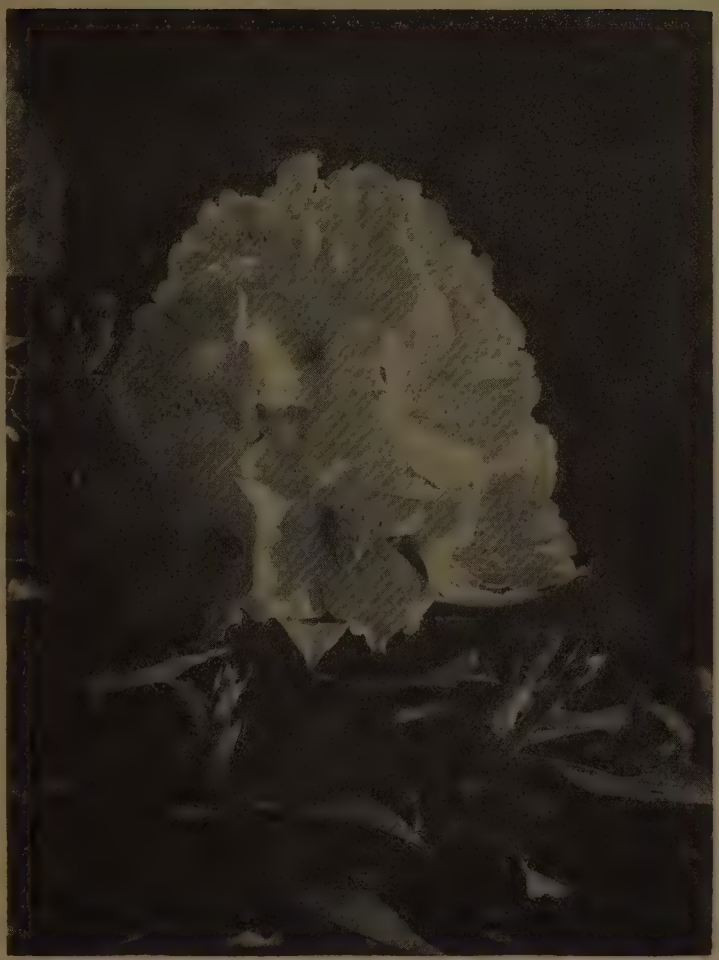
Layering

The easiest method of propagating rhododendrons in small quantities is by layering. In late winter a thin, flexible branch near the base of the plant should be selected and the soil beneath the branch made open and friable by adding coarse sand and well rotted compost or peat; this should be prepared to a depth of 4 in. and a hole scooped out in the soil.

An upward sloping cut is made half way through the branch in wood produced early in the year. The part of the branch with the cut in it is then placed in the hole, pegged into the soil with a piece of bent wire, and the soil mounded over the cut and part of the branch. The tip of the shoot should be tied almost vertically to a bamboo stake.

The soil over the layer should be kept moist during the year and in April it should be scraped away slightly to see if roots have formed. When roots have formed the branch should be severed from the parent plant, but left in position for another 15 months, when it can be planted in a permanent position. Layers may often need to be attached to the parent plant for 2 years before they are severed.

RHODODENDRON ALICE



[*Perry*

Alice is one of the best rhododendrons for general garden use. It produces large trusses of pink flowers.

Aerial layering has been recommended, but has seldom proved satisfactory.

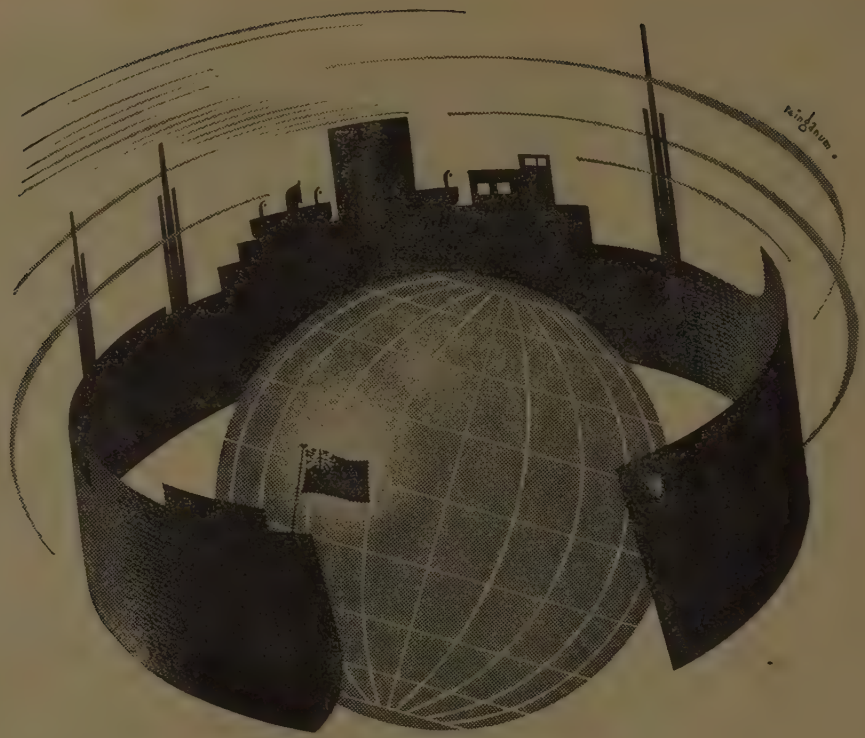
Grafting

Many rhododendrons are propagated by grafting on to plants of *R. decorum*, *R. griersonianum* raised from seed, or *R. elegans* raised from cuttings; overseas *R. ponticum* is used. Deciduous azaleas are grafted on to *R. luteum* (*Azalea pontica*).

The method pioneered by Dr J. S. Yeates of Massey Agricultural College has proved most satisfactory for grafting rhododendrons. In this technique the stock plants are grown in pots until midsummer, by which time the current season's wood has hardened. Similar shoots of the current season's growth are selected from the scion variety.

The type of graft used is the cleft graft. The tip of the stock plant is cut off level and a vertical cut about 2 in. long is made downward. The scion shoot is reduced to 6 in. long or 4 good leaves and must be free of insects and disease. The base of the scion is cut in a thin V and inserted in the top of the stock so that the inner barks of scion and stock are in contact. The union is then tied with raffia and waxed with grafting wax, and the whole area surrounded with damp sphagnum moss.

The whole plant is placed in a plastic bag which is tied at the mouth



Round the world every 70 hours

The mooring lines are cast off. The water astern begins to swirl. The gap between ship and quay grows steadily wider.

Another ship is leaving a New Zealand port, homeward bound. It's not a particularly noteworthy occasion, seen in isolation. But see it in perspective, as part of the over-all pattern, and a very different picture emerges. This is the beginning of only *one* voyage but within the space of a single year the ships that serve New Zealand make between them no less than 250 voyages, out or home. On each round trip (New Zealand — United Kingdom — New Zealand) the ship covers about 26,000 miles which means that, in the course of a year, the ships of New Zealand Overseas Shipping Lines sail, between them, the almost incredible distance of 3,250,000 miles. Over three million miles... That's equal to sailing from Auckland to the Bluff every day of the year for more than eight solid years. It's equal (if you've a taste for Science Fiction) to making thirteen trips from the earth to the Moon. It's equal to 125 journeys round the world, at the rate of one journey in every 70 hours right through the year. By any standards, the ships do a very full year's work. But work costs money and the cost of the ship's work produces even more astronomical figures.

In 1939 the operating expenses arising out of a round voyage were around £57,000. Today they are about £240,000 — over four times as much. The cost of running New Zealand's shipping service is therefore in excess of £30,000,000 annually.

That is the figure on one side of the ledger, a figure that is the total of many separate items — labour costs, fuel costs, port dues and so on.

On the other side there is only a single item: the money you pay in freight rates and passenger fares. And these charges are *not* running at a level of more than four times as much as they were in pre-war years. Everything possible has been — and is being — done to offset the continuing rise in operating costs, with the result that the average of freight rates today is only just over three times as much as it was before the war.

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and placed in a shaded position. Provided the scion was free of pests and diseases, the union should take place without further attention.

Cuttings

Propagation by cuttings is normally satisfactory only in a heated propagating bench. The bench or box or pot should be filled with coarse river sand only or a mixture of equal parts of good peat and coarse river sand. Current season's shoots are selected in February or March and two leaves only left at the tip, which should have a growth bud, not a flower bud. A small strip of bark should be cut from one side of the base of the cutting, which is then treated with a rooting hormone. The cutting is inserted firmly in the rooting mixture so that the leaves are just above the surface. The cutting will be ready to pot when fresh growth appears at the tip.

Using this method the home gardener can fill a 5 in. flower pot with the rooting mixture and place cuttings round the edge of the pot. The whole pot should be placed in a plastic bag, which is tied at the mouth and the bag placed in a warm place where it will not receive direct sunshine.

The potting mixture should be equal parts of loam, peat, or leaf mould and coarse sand. A 3 in. pot is large enough for individual plants rooted as cuttings and after they have been potted up the pots should be placed in plastic bags which are only gradually opened at the mouth, so that the plant can harden off slowly.

Some azalea cuttings have been successfully grown outside by inserting them in a prepared bed of rooting material protected from the wind and sun on three sides by a white wooden framework, but open to the south.

Raising from Seed

Deciduous azaleas and rhododendrons for stock plants or breeding can be raised from seed. The seed capsules ripen in late summer or early autumn and should be gathered when they are brown, but before they split open. The seed should be stored in a cool, dry place in paper bags, correctly labelled, and then sown in early spring.

The seed should be free of chaff and sown in seed boxes. The soil mixture usually used is one part of sterilised loam, 2 parts of peat, and 2 parts of coarse river sand. Some gardeners sift a little dead sphagnum moss over the surface. Excellent results have also been obtained by filling a seed box with well rotted sawdust only, but the seedlings must be pricked out very early, when two true leaves are formed.

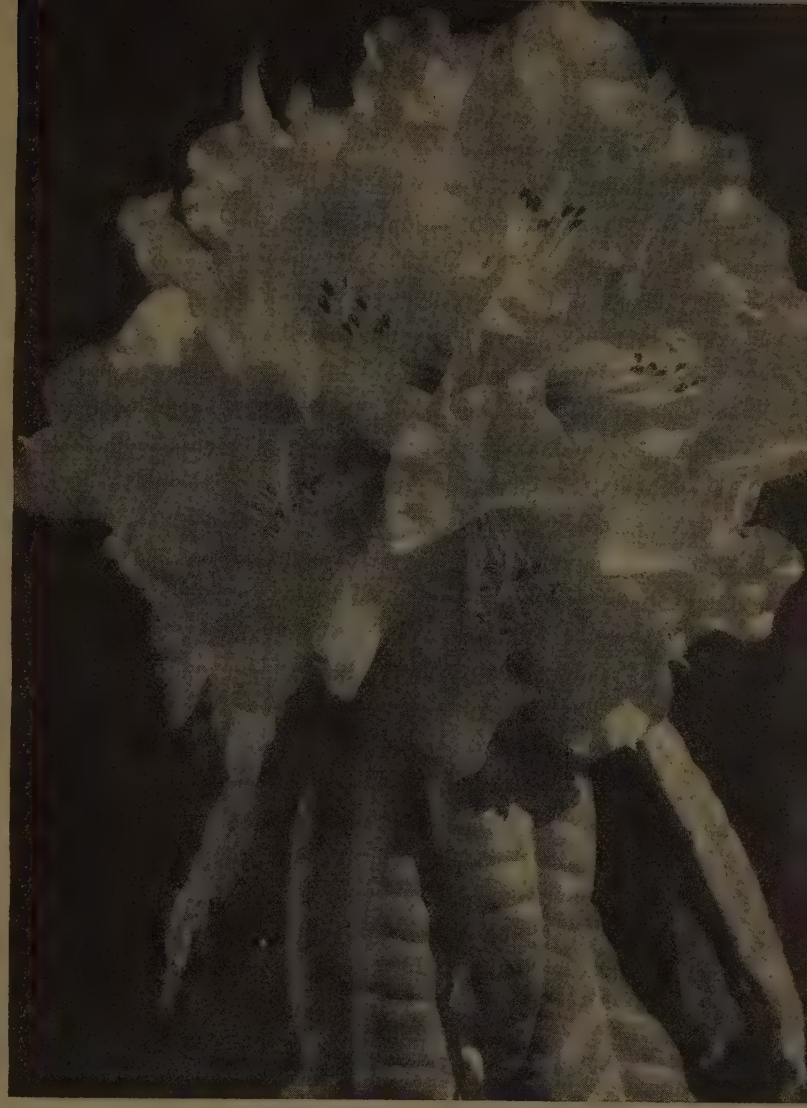
The seed is sown thinly and pressed into the surface, and watered but not covered with soil. The box should be covered with a sheet of glass and placed in a shaded frame or on the south side of a building. The glass should be lifted as soon as germination is seen and removed when the majority of seeds have germinated.

Quite frequently moss and algae develop on the soil surface; these can be controlled by watering with thiram 80 per cent. wettable powder at 1 dessertspoonful to 1 gallon of water.

Seedlings should be pricked out into boxes of the same soil mixture to which 4 oz. of bone meal per bushel of mixture has been added. These boxes should be kept in a shaded position until the plants are growing well, and about 18 months from seed sowing they can be planted into nursery beds.

Selection of Varieties

The number of varieties of rhododendrons and azaleas offered by specialist nurserymen can be quite bewildering to the average gardener.



▲ Cornubia is an early-flowering rhododendron with bright red flowers. Elliott photograph.

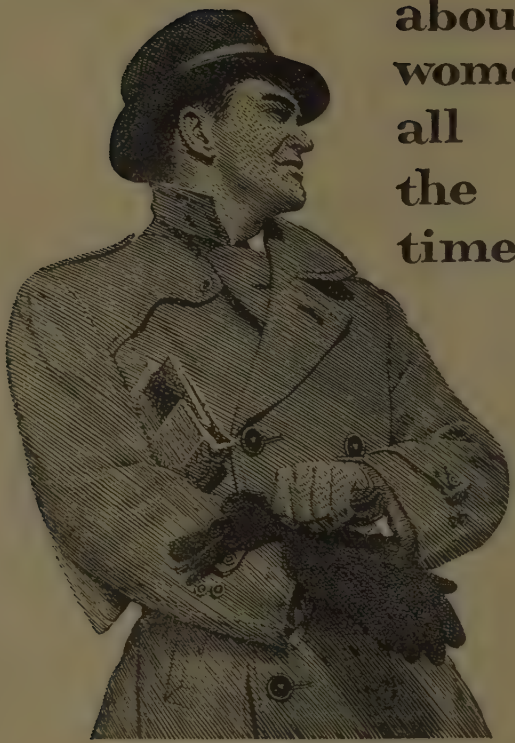
An understanding of the different types will enable the most suitable varieties to be chosen.

1. Evergreen Azaleas

Evergreen azaleas are mostly dwarf spreading plants, though in some areas such as Rotorua they will grow up to 8 ft. or 10 ft. They are very suitable for planting along the front of shrub borders or in shady borders adjacent to the house; the Kurume types are excellent for rock gardens.

The flowers of azalea indica are white, pink, red, or mauve, and varieties can be bought with single, double, or "hose in hose" flowers; the last named have one row of petals superimposed on another as compared with

I think about women all the time!



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And today's versatile door shelves—it was you who said you wanted room to store eggs and small items—a place to put large and small bottles where they wouldn't topple over.

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A host of worthwhile additions to the Frigidaire Appliances you use every day come about through this happy combination of you and me. So you see why I'm proud to be a Frigidaire engineer, and truly say "I think about women all the time."

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doubles, which have many petals at one level.

Kurume and Kaempferi azaleas are dwarf, dark green leaved shrubs with pink, red, or lavender flowers. Most of them have been raised in the East and have Oriental names.

2. Deciduous Azaleas

There has been a great deal of hybridising with deciduous azaleas and many of them are named after the nurserymen or area where they were bred. The feature of these azaleas is their brilliant colouring, red, orange, yellow, and salmon pink being predominant; some varieties are scented. The late Edgar Stead of Ilam bred some particularly fine varieties which are gradually coming into commerce.

These azaleas are more vigorous than the evergreen types, normally flowering later, in early summer, and are excellent as single specimens among other shrubs, especially evergreens such as rhododendrons, camellias, or pieris. Massed in a bed they make a very striking display for 6 weeks in September and October. In the colder districts the leaves colour brilliantly in autumn.

Rhododendrons

The range of species and varieties of rhododendrons may confuse the gardener, but it is better to select well proved types rather than leave the selection to the nurseryman. To assist in the choice of suitable varieties, they have been divided into three sections:

(A) Dwarf types suitable for rock gardens or narrow, shaded borders;

(B) Medium or tall plants for general garden planting;

(C) Special varieties of merit which should be grown in lightly shaded, protected situations.

Few nurserymen grow quantities of any one variety and it is often advisable to order a particular variety at least one season before it is required. Members of the New Zealand Rhododendron Association can sometimes obtain varieties not in commerce through this organisation.

(A) Dwarf Varieties

Blue Beard and Blue Tit (lavender blue)
Doncaster (red)
Griersoni anum (scarlet)
Lapponicum (mauve)
Tally Ho (scarlet)
Williamsianum (pink)

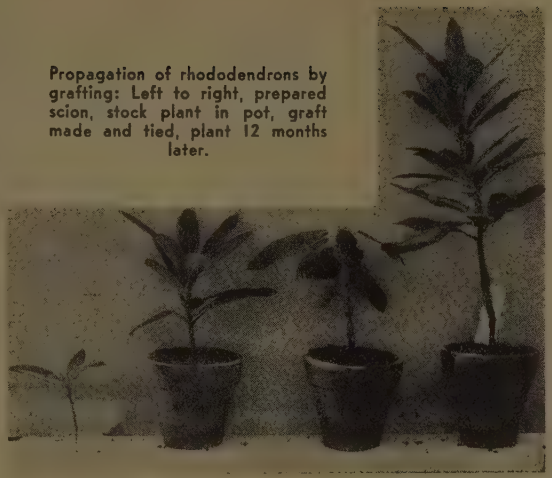
(B) General Garden Planting

Alice (medium, pink)
Arboreum (tall, red)
Barclayi (tall, red)
Cornubia (medium, red)
Countess of Haddington (medium, pale pink)

Fragrantissimum (medium, white, scented)

Gills Crimson (medium, crimson)
Ivery's Scarlet (medium, scarlet)
Loderi Pink Diamond (medium, pink)

Loderi Venus (medium, white)
Pink Pearl (medium, pink)
Purple Splendour (medium, mauve)
White Pearl (medium, pinky white)



Propagation of rhododendrons by grafting: Left to right, prepared scion, stock plant in pot, graft made and tied, plant 12 months later.

(C) Special Varieties

Decorum (medium, white, fragrant)
Grande (tall, yellow)
Griffithianum (tall, white, fragrant)
Maddeni (medium, pinky white, fragrant)
Sinogrande (tall, cream)

Pests and Disease Control

In general rhododendrons and azaleas are attacked by few pests and diseases; they do not require frequent spraying; most of the troubles are fairly damaging and prompt control is necessary.

The table below describes the symptoms, cause, and control of the commoner pests and diseases attacking these plants.

COMMONER PESTS AND DISEASES ATTACKING RHODODENDRONS AND AZALEAS

Symptoms	Cause	Control
1. The Whole Plant		
Young plants fail to grow	(a) Inadequate drainage	Improve drainage
	(b) Lack of nutrients or moisture	Apply fertiliser and mulch. Water if necessary
	(c) Grass-grubs at root	Water soil with DDT 50 per cent. wettable power, 1 oz. to 30 sq. yds.
Branches die	Phytophthora root rot	Cut out and burn dead branches. Drench soil with copper oxychloride, 1 lb. to 10 gallons of water to 5 sq. yds.
2. Leaves		
*Leaves have silvery appearance on upper surface and sticky brown under surface	Thrips attack	Spray with DDT, lindane, or dieldrin. This insect also attacks other plants such as clethra and laurustinus and gladiolus
*Leaves have leaden colour	Silver leaf disease	Cut out infected branches and dead wood and paint wounds. Remove whole plant where severe
Leaves have brown margins	Wind damage or sun scorch	Provide protection
Brown or grey spots on leaves	Fungus attack (pestallozia or cercospora)	Spray with copper oxychloride 3 oz. to 4 gallons
Raised coloured areas on leaves of azaleas	Leaf gall disease	Cut off infected tips and leaves. Spray with copper oxychloride 3 oz. to 4 gallons at bud burst (timing is important)
Leaf margins and tips pulled down to form tunnel	Azalea leaf miner	Repeat spraying with DDT or lindane
3. Shoots and Flower Buds		
Young shoots die back	Infection with phytophthora	Cut off and burn dead shoots, spray plants with copper oxychloride 3 oz. to 4 gallons
Flower buds die	(a) Frost damage in winter	Provide protection
	(b) Bud blast disease	Remove and burn dead buds; spray with copper oxychloride in January, April, and July (timing is important)
Tips of shoots and leaves tied together	Leaf roller caterpillar	Spray with lead arsenate or malathion

* Some varieties of rhododendrons have naturally occurring brown hairs on the under side. Few of these are attacked by thrips. Where thrips infestation is present, the under side feels distinctly sticky. If the leaves are silvery or leaden in colour and not sticky, the plant is probably infected with silver leaf disease.

Garden Work in June

For much of the winter it will not be possible to work the soil, but there are several tasks which must be attended to in June.

Planting and Replacing Roses

New rose beds should have been prepared previously and the spacing distances should now be marked out. Roses are most effective where a feature area is devoted to them, though they can be very useful in a mixed border also. In beds, bushes can be planted 24 in. to 30 in. apart and standard roses 3 ft. apart. The standards can be used to break the line and level of the bed and create added interest. Where sick bushes are being replaced the surrounding ground should be partially sterilised by the addition of 4 oz. of copper oxychloride per square yard or with ½ pint of formalin in 3 gallons of water per square yard. When formalin is used the ground should be covered with sacks for 2 days and can be dug and planted after 2 weeks.

Plants received from a nursery should be planted out immediately. Where winters are severe, however, the plants should be heeled in in a sheltered area. The roots of roses dry out very quickly and it is wise to soak them in water for ½ hour before they are planted. Any damaged roots should be removed. It is unwise to accept from the nurseryman any plants which show signs of growth directly from the root area, as such bushes will continue to sucker and be a perennial nuisance. The planting hole should be large enough to accommodate the roots in their natural spread-out position and deep enough to place the bud union eventually at or below ground level. The soil should be tramped firmly among the roots, and standards or exposed bushes should be staked.

An outlay on metal labels will be most rewarding in keeping the plants correctly named. Pruning and fertilising should be deferred until later in the season, but not forgotten.

A new rose bush before planting. The roots should be trimmed and the branches should be left until the normal pruning time for the district.

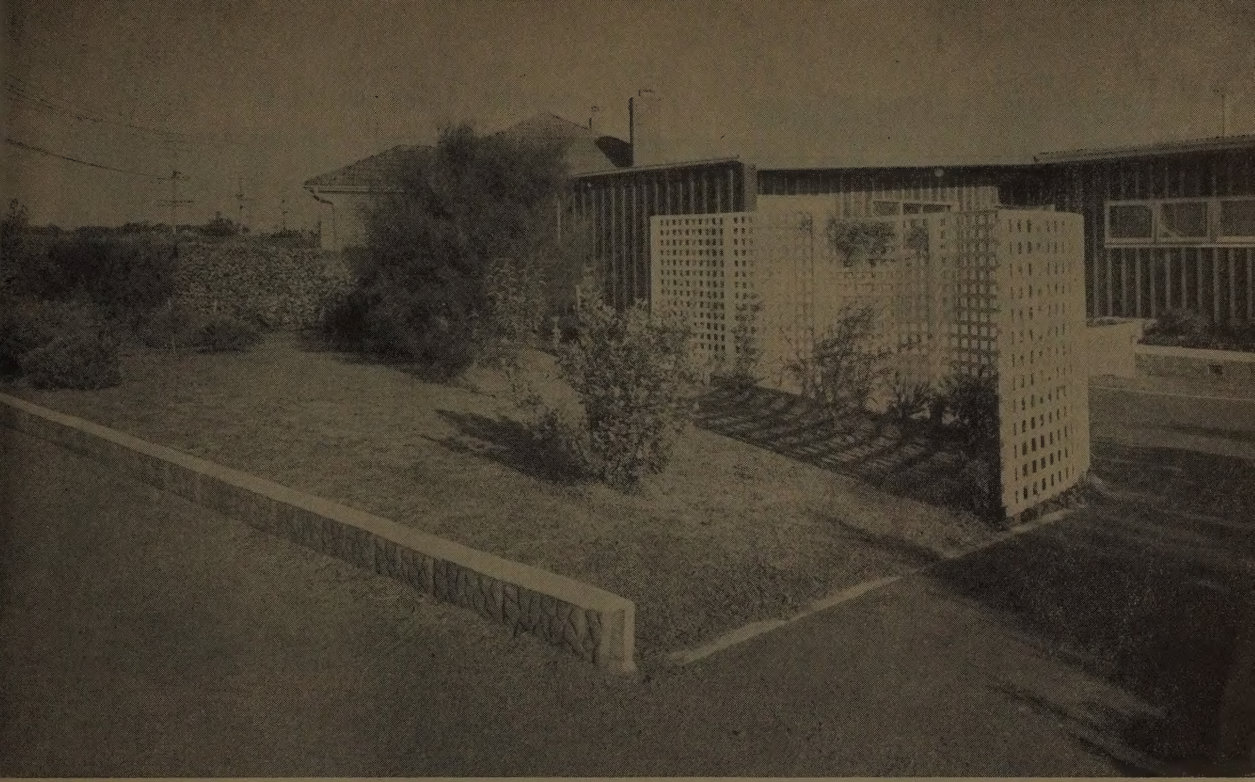
[*Green and Hahn*

Garden sundries should each have their place in the toolshed. Thorough cleaning of all tools after use and general tidiness in the shed assist to make gardening less toil and more pleasure.

Shrub Planting

Shrub and tree planting should be carried out in either early or late winter, the cold and wettest period being avoided, but pot-grown material can be planted whenever the soil is workable. The tips of deciduous shrubs should be shortened, thus shaping the bush, and any damaged roots should be removed. If roots protrude through the sacking of balled plants the sacking should be untied and loosened round the top, but should not be removed, as it may damage the roots excessively. If holes have been dug much larger than required to accommodate planting, a hole just large enough to contain the roots at the original planting level should be made. If the plant sits either too high or too low after planting, it is best to replant immediately. In new ground holes should be dug much larger than require to accommodate the roots and the soil below loosened and enriched. After planting this area should be left slightly higher to allow for settling. Especially on windswept corners and with shallow-rooted plants, it is desirable to stake as well as label the plants.

Some balled plants grown in heavy soils have their roots enclosed in an almost impenetrable ball of clay. In most instances the ball should be



broken to allow easier mingling of roots with the surrounding soil, but certain plants such as ceanothus, cistus, romneya, and brooms resent root disturbance and should be planted as received.

Colours of Hydrangeas

Colour changes in hydrangeas are often a mystery and sometimes a problem to gardeners. Experiments have shown that it is the presence of aluminium within the plant which gives the blue colouring to the common hydrangeas. As plants are better able to take up aluminium in acid soils, the acidification of the soil or preferably the addition of alum or aluminium sulphate at 1 lb. per square yard and liberal use of potash will produce good blue shades.

Pink blooms are produced when the soil is neutral or slightly alkaline and contains plenty of phosphate. This can be achieved by the addition of superphosphate and lime, but if too much lime is added, the soil may become excessively alkaline and the plants suffer from a deficiency of iron seen as a mottling of the leaves. If this has occurred, flowers of sulphur should be applied now to make the soil less alkaline and correct the deficiency.

Moss in Lawns

Moss occurs in lawns for several reasons, the most usual ones being lack of manure, poor drainage, and lack of aeration. If it is not practical to use the drainage methods described last month for long-term improvement, pricking over the whole area with a fork and topdressing with coarse sand will improve drainage and aeration. The lawn can be fertilised again next month, but if moss persists where these factors have been regularly attended to, sodium pentachlorphenate at 1 oz. to 30 sq. yds. should be applied.

Olearia Hedges

The terminal shoots of the golden akeake or olearia are often unsightly with rosettes of malformed and stunted leaves. This is caused by the olearia gall midge which is prevalent throughout the country. To combat this the hedge should be trimmed back hard at this time, all trimmings being burnt. During September sprays of nicotine sulphate or DDT will also help.

Protection of Rockery Plants

Where wet weather continues day after day it is common for some species of rock plants to rot off at the central growing point of a rosette or at ground level. Often it is not worth persisting with plants that do this regularly, but for special plants a sheet of glass or cloche to provide shelter from the rain or additional shingle under the leaves for extra drainage will prevent the rotting. Edelweiss, soldanella, and hairy or silky foliaged plants are particularly susceptible to this trouble.

Lithospermum prostratum is another plant with a habit of dying out. As this plant dislikes lime, a liberal dressing of flowers of sulphur to the surrounding soil may be helpful.

Any rocks which are unstable in the rockery should be reset to avoid accidents. Even where this entails considerable work it is most necessary.

▲ Trellis fences create a pleasant screening effect and against them interesting plants can be grown. They should be painted and checked for durability regularly. Sparrow photograph.

Fertiliser Requirements

To many one of the most perplexing flower garden problems concerns the use of fertilisers, supplies of which should now be considered. Compost, as well as having a particularly desirable physical effect on the soil, supplies sufficient of many of the elements required in minor quantities, but rarely contains sufficient of the major elements of nitrogen (N), phosphorus (P), and potassium (K).

No gardener wishes to turn the shed into a laboratory and this is not necessary to feed the plants satisfactorily, but a well chosen range of the basic fertilisers, preferably bought in bulk and stored in drums or wooden boxes, will last the season through. A basic list for the average garden would include:

Sulphate of ammonia: Supplying N. Used especially for regular 3-monthly lawn dressings and for quick responses of vegetative growth.

Blood and bone: Supplying both N and P in more slowly available forms, thus encouraging growth and flowers.

Bonedust: Supplying both N and P in slowly available forms; useful for bulbs, trees, and shrubs.

Superphosphate: Supplying P readily and can be used in seed sowing, for promoting young root growth, in lawn dressings, and for encouraging flowers.

Sulphate of potash: Supplying K, which assists the general health of plants in developing sturdiness and disease resistance.

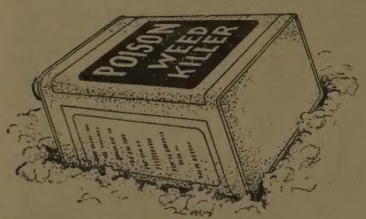
Lime: Supplying calcium, and is useful for correcting soil acidity. Most plants prefer a slightly acid soil and lime should not be used indiscriminately.

For very special needs materials such as sulphur, alum, borax, sulphate of iron, or Epsom-salt may need to be purchased in small quantities. It is possible to buy so-called complete fertilisers, but a balanced fertiliser can be made much more economically by the combination of these basic materials. It is not possible to be specific, but a slow and lasting effect can be obtained using 4 parts of blood and bone to 1 part of sulphate of potash. For general use the following mixture will be found useful:

4 parts of superphosphate
4 parts of blood and bone
1 part of sulphate of ammonia
1 part of sulphate of potash

Sundries and Supplies

Stocktaking of the wide range of sundries which are used in the garden and the cleaning of the toolshed can be attended to now.



Empty tins which contained poisonous arsenical weedkillers or spraying materials should not be left lying about, but should be buried deeply or destroyed. Tins containing such material should be stored out of reach of children.

Bamboo stakes could be cut and graded in various lengths and sizes, including twiggy bits for use among herbaceous perennials. Wire, metal, or wooden stakes should be on hand.

A search through a reliable seed catalogue may suggest new plants and schemes for trial and the seed can be ordered.

Where seedlings are raised each year, a check on the supply of turfy loam, leaf mould, peat, sand, seed trays, and clean pots may reveal a need which should be promptly dealt with.

A stock of metal or wooden labels should be on hand for use whenever new plant material is purchased. Twine, raffia, paper-covered wire strips, and old nylon stockings will be needed for tying up various plants, while for measuring spray materials it is wise to purchase an inexpensive pint measure and standard plastic measuring spoons.

A check on spray materials and dusts may reveal a need for replacement. Be sure that hormone weedkillers are not placed near stored bulbs, tubers, seeds, or fertilisers and that the container is tightly closed to prevent the escape of fumes.

Watering cans should be examined for holes and if an old can is used only for applying hormone weedkiller, time would be well spent in labelling it thus. Garden hoses and other watering systems should be checked and the necessary additional couplings or attachments can be purchased. Worn washers should be replaced. It may be necessary to replace handles on some tools or straighten parts of others; sharpening and oiling can be done at the same time.

General

Climbers on walls and trellises such as ornamental vines and wisteria can be trained by cutting the growths back to buds on the main limb structure. The supports should be checked for durability.

[*Sparrow*

Supports should be provided against brickwork for climbing plants such as wisteria.

The woolly bear caterpillar is usually stripping the leaves of cinerarias and rangiora at this time. These plants should be sprayed with arsenate of lead or DDT and any plants of groundsel, another host, should be removed.

Where sweet peas are to be sown in August trenching should not be delayed. The bed should be well limed and seed of the summer flowering varieties such as Spencer's Waved should be obtained.

Shrubs flowering on new wood such as ceratostigma, crotalaria, erythrina, spirea, and *Clematis jackmani* should be pruned back hard to within a few inches of the second-year wood. Young plants need have only the tips of the shoots removed. Strongly growing plants of fuchsias, leonotis (lionstail), oleander, ceanothus, and others which flower on the wood produced last year should be pruned by removing weak shoots and as much as possible of the shoots which flowered last season.

In the greenhouse hydrangeas can be potted on and given some heat. Hippeastrums for flowering inside should be watered and given gentle heat to start them into growth. Calceolarias can be potted into the pots in which they are to flower. During this period, when growth of many plants is at a minimum, these plants should be kept too dry rather than too wet.

Time should be taken to read over notes made on successes and failures during this last season. By so doing much can be learnt and gardening will be more worth while.

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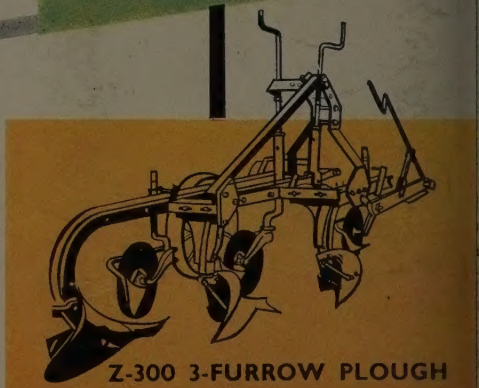

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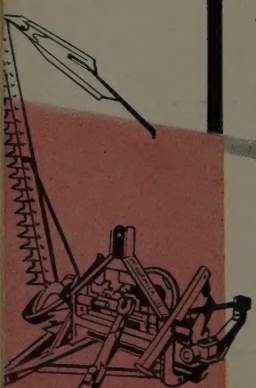

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